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SCIENCE TEACHING IN THE PUBLIC JUNIOR HIGH SCHOOL.

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REPORT NUMBER OE-29067 PUB DATE 67
EDRS PRICE MF-$0.18. HC NOT AVAILABLE FROM EDRS. 70P.

DESCRIPTORS- *SCHOOL ORGANIZATION, *SECONDARY SCHOOL SCIENCE, *SCIENCE TEACHERS, *STUDENT ENROLLMENT, GRADE 7, GRADE 8, GRADE 9, INSTRUCTIONAL MATERIALS, INSERVICE TEACHER EDUCATION, SCHOOL STATISTICS, SCIENCE CLUBS, SCIENCE FAIRS, SCIENCE CONSULTANTS, JUNIOR HIGH SCHOOLS, NDEA TITLE III, DISTRICT OF COLUMBIA

INFORMATION RELATED TO SCHOOL ORGANIZATION, PROCEDURES, PRACTICES, AND CONDITIONS AFFECTING SCIENCE INSTRUCTION IN THE PUBLIC JUNIOR HIGH SCHOOLS IS PRESENTED. QUESTIONNAIRES SENT TO THE PRINCIPALS OF A RANDOM SAMPLE OF SCHOOLS WHICH INCLUDED GRADES 7, 8, AND 9 WERE USED TO OBTAIN INFORMATION. CATEGORIES OF INFORMATION INCLUDED (1) ENROLLMENT AND ORGANIZATION, (2) INSTRUCTIONAL RESOURCES, (3) BUDGET, (4) SCIENCE CLUBS AND FAIRS, (5) INSERVICE TEACHER EDUCATION, AND (6) CONSULTANT SERVICE. FOR ANALYSIS OF DATA, SCHOOLS WERE CLASSIFIED AS SMALL, MIDDLE-SIZED, OR LARGE. ALL SCHOOLS OFFERED SCIENCE COURSES AT SOME GRADE LEVEL, BUT NOT ALL SCHOOLS OFFERED THEM AT EACH GRADE LEVEL. THERE WAS AN INCREASE IN THE NUMBER OF SCHOOLS OFFERING SCIENCE AS THE GRADE LEVEL INCREASED. GENERAL SCIENCE WAS THE MOST COMMON SCIENCE COURSE. THE LARGEST SCHOOLS HAD PROPORTIONATELY FEWER SCIENCE TEACHERS THAN THE NATIONAL AVERAGE. NEARLY ALL SCHOOLS USED SCIENCE TEXTBOOKS, BUT ONLY 80 PERCENT USED THEM AT ALL THREE GRADE LEVELS. SUPPLEMENTARY MATERIALS WERE USED PROGRESSIVELY MORE AT HIGHER GRADE LEVELS. COMBINATION CLASSROOM LABORATORIES WERE THE MOST COMMON FACILITY. MORE THAN 25 PERCENT OF THE SCHOOLS, HOWEVER, DID NOT PROVIDE ANY TYPE OF LABORATORY. OVER 80 PERCENT OF THE SCHOOLS USED NATIONAL DEFIENSE EDUCATION ACT (NDEA) FUNDS TO PURCHASE SCIENCE EQUIPMENT, AND APPROXIMATELY 33 PERCENT OF THE SCHOOLS USED NDEA FUNDS FOR REMODELING BUILDINGS. ABOUT 50 PERCENT OF THE SCHOOLS SPONSORED SCIENCE CLUBS AND SCIENCE FAIRS. THIS DOCUMENT IS AVAILABLE AS CATALOG NO-5.229--29067 FROM THE SUPERINTENDENT OF DOCUMENTS, U.S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D.C. 20402, FOR $0.45. (AG)

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HIGHLIGHTS

- All public junior high schools offer science courses at some grade level, but not all offer them in each of the grades.
- Teachers with science assignments constitute 13 percent of the total instructional staff of all junior high schools, although relatively few of these teachers teach science full time. One-third of them spend 10 hours or fewer per week in science teaching.
- Seventy-seven percent of the total junior high school students are enrolled in some science class.
- General Science is the most common science course. It is offered in about 95 percent of the schools, with 67 percent of the total students enrolled.
- The mean size for all junior high school science classes is 29, although some regions of the Nation report means for a particular science subject as high as 42.
- Homogeneous grouping for science instruction is reported in about 60 percent of the schools, with the frequency of such grouping related to school size and to grade level.
- A combination classroom-laboratory is the most common teaching facility, although more than one-quarter of the schools do not provide any type of laboratory, and over 40 percent of the large schools report using nonscience rooms for science instruction.
- Most schools give a higher adequacy rating to the general reference collections than to the science collections available in their school libraries.
- Some schools, including over one-tenth of the small ones, report no expenditure of money for science equipment and materials. About seven-tenths of the schools prepare an annual budget for these items.
- The mean expenditure for science equipment and materials per junior high school is about $800, while the median expenditure is approximately $494.
- School size considerably affects the nature of science instruction. The largest schools appear to be doing the poorest job of science teaching.
- Science clubs and science fairs are sponsored by about half of the Nation's public junior high schools.
- About three-quarters of the schools report the availability of science specialists to assist teachers working in the field.

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science teaching in the public junior high school

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OE–29067

Superintendent of Documents Catalog No. 5.229:29067

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1967

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - 45 cents

FOREWORD

IN OUR MODERN TECHNOLOGICAL SOCIETY, development of scientific literacy is recognized as one of the objectives of our educational system. In order to obtain some basic information which will enable us to achieve this goal, information about instructional practices in science is needed.

The Office of Education has made nationwide studies of science teaching at the elementary and secondary school levels, but has not previously published a comprehensive study of any single instructional area for junior high schools. Thus, in the spring of 1963 the Office conducted a study of science teaching in the public junior high schools of the Nation.

The study is based on a sample drawn from a universe of 3,133 public junior high schools containing grades, 7, 8, and 9 only. Attention is focused on science teaching—instructional resources, organization for instruction, course offerings and enrollments, extra-instructional activities, and teaching personnel.

The Office of Education is deeply grateful to the junior high school administrators who supplied the data for the survey. Without their willing cooperation this report could not have been written.

R. LOUIS BRIGHT,
Associate Commissioner for Research.

CONTENTS

Page

iii **Foreword**

1 **Chapter 1. Introduction**

1 Purpose
1 Procedure
2 Presentation of Data

3 **Chapter 2. Enrollment and Organization of Public Junior High Schools**

3 Schools
3 Teachers
3 Students
4 Organization of the School Day
5 Length of Class Period
5 Length of School Year

6 **Chapter 3. Enrollment and Organization for Science**

6 Science Course Offerings and Enrollments

6 Course offerings at various grade levels
6 Course offerings and size of school
6 Science enrollment and school size
8 Science enrollment and geographic region

8 Science Teaching Personnel
9 Class Size
9 High School Graduation Credit
10 Grouping

10 Frequency
10 Criteria
12 Changes anticipated

13 **Chapter 4. Instructional Resources for Science**

13 Textbooks

13 Use
13 Distribution
13 Recency

14 Supplementary Materials

14 Locally prepared resource material
14 Commercial workbooks
15 Locally prepared worksheets

15 Published Reference Materials

15 School library materials
16 Classroom reference materials

16 Audiovisual Aids

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Page

17 Facilities and Equipment
17 Classrooms and laboratories
18 Utilities in science classrooms
18 Storage
18 Special facilities and equipment

19 Chapter 5. Funds for Science
19 National Defense Education Act Funds
19 Use of funds
20 Availability of audiovisual aids
20 Financial Practices
20 Annual budget
20 Estimated expenditures
21 Comparison with science expenditures in 1961
21 Laboratory fees
21 Teacher purchase of supplies

22 Chapter 6. Science Clubs and Science Fairs
22 Science Clubs
22 Distribution by school size and region
22 Teacher sponsors
22 Pupil membership
23 Science Fairs
23 School involvement by school size and region
23 Pupil participation
23 Projects

24 Chapter 7. Improving Science Instruction
24 Inservice Teacher Education
24 Local inservice training
24 Summer curriculum development
25 National Science Foundation institutes
25 Consultant Assistance
25 Sources of specialists
25 Regional patterns
26 Types of consultants

27 Chapter 8. Summary and Implications
27 Summary of Selected Findings
27 Enrollment and organization
27 Instructional resources
28 Funds for science
28 Science clubs and science fairs
28 Inservice teacher education
28 Consultant assistance
29 Implications

Appendixes

31 A. Basic Tables
49 B. Technical Notes
53 C. Questionnaire

Text Tables

A. Percent of public junior high school students enrolled in selected science courses, by geographic region: United States, 1963 — Page 8

B. Percent of classroom teachers who teach science in public junior high schools, by number of periods of science taught per week, and by school size: United States, 1963 — 9

C. Percent of public junior high schools anticipating changes in emphasis in homogeneous grouping for science classes during ensuing 2-year period: United States, 1963 — 12

D. Percent of public junior high schools by most recent copyright date of science textbooks used, and by course: United States, 1963 — 14

E. Mean number of titles of science-related books in public junior high schools, by school's adequacy rating of science reference material, and by school size: United States, 1963 — 16

F. Percent of public junior high schools having selected science facilities, by school size: United States, 1963 — 17

G. Percent of public junior high schools having certain science facilities and equipment: United States, 1963 — 18

H. Percent of public junior high schools using National Defense Education Act funds for remodeling science facilities and purchasing science equipment, by school size and by geographic region: United States, 1963 — 19

I. Percent of public junior high schools by estimated expenditures for science equipment and materials (other than books), and mean and median expenditures, by school size: United States, 1963 — 20

J. Number of teacher-sponsors and pupil-members in public junior high school science clubs, by school size and geographic region: United States, 1963 — 22

K. Percent of public junior high schools sponsoring science fairs, by grade level, by school size, and by geographic region: United States, 1963 — 23

L. Percent of public junior high schools participating in inservice education programs for science teachers, by type of program, source of funds, and school size: United States, 1963 — 24

M. Percent of public junior high school teachers with National Science Foundation science institute experience, and percent of schools with at least one such teacher on faculty, by school size and geographic region: United States, 1963 — 25

Figures

1. Percent distribution of public junior high schools, pupils, and teachers by school size: United States, 1963 — Page 4

2. Percent distribution of public junior high school students enrolled in selected science courses, by school size: United States, 1963 — 7

3. Percent of public junior high schools using grouping for science classes, by school size: United States, 1963 — 10

4. Percent of public junior high schools using certain criteria in grouping for science instruction: United States, 1963 — 13

Basic Tables

1. Number and percent of public junior high schools, by size and by geographic region: United States, 1963 — 31

2. Number and percent of classroom teachers (full time and part time) in public junior high schools, by geographic region and by school size: United States, 1963 — 31

3. Number and percent of students in public junior high schools, by geographic region and by school size: United States, 1963 — 32

4. Percent of public junior high schools by number of regularly scheduled class periods per day and by school size: United States, 1963 — 32

5. Percent of public junior high schools by length of class periods and by school size: United States, 1963 — 32

6. Percent of public junior high schools by length of school year and by school size: United States, 1963 — 33

7. Percent of public junior high schools offering selected science courses, by grade level and by school size: United States, 1963 — 33

8. Number and percent of public junior high school pupils enrolled in certain science courses, by school size: United States, 1963 — 34

9. Percent of classroom teachers who teach science in public junior high schools, by number of periods of science taught per week per teacher, and by geographic region: United States, 1963 — 34

10. Mean size of science classes, by course, by grade level, and by school size: United States, 1963 — 35

11. Mean size of science classes, by course and by geographic region: United States, 1963 — 35

12. Percent of public junior high schools giving high school graduation credit for science courses, by course and by grade level: United States, 1963 — 36

13. Percent of public junior high schools by use of science textbooks, by grade and by school size: United States, 1963 — 36

14. Percent of public junior high schools by practices of textbook distribution, by grade and by school size: United States, 1963 — 37

Page

15. Percent of public junior high schools by selected practices of textbook distribution, by geographic region: United States, 1963 37

16. Percent of public junior high schools by most recent copyright date of science textbooks used, by course and by school size: United States, 1963 38

17. Percent of public junior high schools using supplementary material in science courses, by type of material, by grade, and by school size: United States, 1963 39

18. Percent of public junior high schools with school libraries, and their adequacy rating of selected science-related library material, by school size: United States, 1963 40

19. Percent of public junior high schools by estimated number of titles of science-related books (other than textbooks or encyclopedias), and mean and median number of titles per school, by school size: United States, 1963 41

20. Percent of public junior high schools by availability of certain science-related classroom reference materials, by school's adequacy rating and by school size: United States, 1963 41

21. Percent of public junior high schools having selected audiovisual aids for science instruction, by degree of availability and by school size: United States, 1963 42

22. Percent of public junior high school pupils enrolled in science courses having access to certain science facilities, by grade level and by school size: United States, 1963 43

23. Percent of public junior high schools reporting combination classroom-laboratory facilities, by course: United States, 1963 43

24. Percent of public junior high schools according to utilities available in science classrooms, by school size: United States, 1963 43

Page

25. Percent of public junior high schools by type of science storage, by school size: United States, 1963 44

26. Percent of public junior high schools reporting various financial practices related to the purchase of science equipment, by school size: United States, 1963 44

27. Percent of public junior high schools reporting various financial practices related to the purchase of science equipment, by geographic region: United States, 1963 44

28. Percent of public junior high schools by estimated expenditures for science equipment and materials (other than books), and mean and median expenditures, by geographic region: United States, 1963 45

29. Percent of public junior high schools sponsoring science clubs, by number of teacher-sponsors and pupil-members, and by school size: United States, 1963 45

30. Percent of public junior high schools participating in interschool science fairs, by grade level and by school size: United States, 1963 45

31. Number and percent of school-sponsored science fair projects in public junior high schools, by grade level at which project was prepared, and by school size: United States, 1963 46

32. Percent of public junior high schools participating in inservice education programs for science teachers, by type of program, source of funds, and geographic region: United States, 1963 46

33. Percent of public junior high schools reporting the availability of specialists or consultants to science teachers, by type, source, and school size: United States, 1963 47

34. Percent of public junior high schools reporting the availability of specialists or consultants to science teachers, by type, source, and geographic region: United States, 1963 48

Chapter 1

Introduction

Purpose

SCIENCE IS AN ACCEPTED PART of the school curriculum. Although studies of existing practices have been published for both elementary and senior high school levels, what occurs in the junior high school has been largely conjecture. Not only have published studies been lacking, but the new science curriculum developments generally have been designed for either senior high school or elementary school use. However, recent science curriculum projects, initiated by such recognized scientific organizations as the American Association for the Advancement of Science and the American Geological Institute, attest to new interest in science instruction for grades 7, 8, and 9.

Objective data about the use of Government moneys to improve science instruction in the junior high schools, such as for the purchase of equipment and remodeling under the National Defense Education Act, title III, heretofore have not been available. Also, information about participation in science clubs and fairs, some of which receive support at the national level, previously has not been available for the junior high school level.

This study includes information on overall school organization as well as on procedures, practices, and conditions affecting science instruction in public junior high schools. General aspects covered are:

- Distribution of schools by size categories and geographic regions.
- Pupil enrollment and numbers of teachers.
- Organizational patterns, including separate class period scheduling practices, and length of school year.

Specific aspects of science instruction covered are:

- Enrollment and organization for science, including courses and teaching personnel, as well as grouping.
- Instructional resources and practices relating to their use, including use of National Defense Education Act funds.
- Extra-instructional activities, including science clubs and fairs.
- Inservice education for teachers.

Procedure

Information for the study was obtained through the use of a questionnaire, a copy of which is included as appendix C.[1] Although the original questionnaires were distributed in the spring of 1963, followup was not completed until 1964. Informal personal visits to junior high school science classrooms in many States through 1965 indicated that practices described in the study had changed little since the field survey was completed.

A random sample of schools was selected from the universe of public junior high schools in the United States. For the purpose of the study a public junior high school was defined as one which had grades 7, 8, and 9, and no other grade.

The questionnaire was sent to the principal of each junior high school selected. He was asked to reply, with assistance from his science staff. Other administrators—such as the assistant principal, head counselor, science department chairman, and curriculum coordinator—also completed questionnaires.

A total response rate of over 90 percent was obtained, although a number of responses were from schools which were judged to be out-of-scope.

Technical aspects of the study, including the sample design and statistical treatment of data, are discussed in appendix B, Technical Notes.

[1] The questionnaire was designed by Richard M. Harbeck and Ellsworth S. Obourn, formerly specialists in science, U.S. Office of Education.

Presentation of Data

The data in this study are presented in 34 basic tables (app. A). With some exceptions, data are analyzed by school enrollment size groups and geographic region. The school enrollment size categories are as follows:

1–499 pupils (small schools)
500–1,499 pupils (middle-sized schools)
1,500 and over pupils (large schools)

Although the sample of schools was selected for a large middle-sized group, 500–1,499, in some instances the data are divided into two subgroups for presentation: 500–999 and 1,000–1,499.

The geographic regions and those States within each region are those adopted by the Office of Business Economics (omitting Guam, the Canal Zone, Puerto Rico, and the Virgin Islands):

New England
Connecticut
Maine
Massachusetts
New Hampshire
Rhode Island
Vermont

Great Lakes
Illinois
Indiana
Michigan
Ohio
Wisconsin

Mideast
Delaware
District of Columbia
Maryland
New Jersey
New York
Pennsylvania

Southeast
Alabama
Arkansas
Florida
Georgia
Kentucky
Louisiana
Mississippi
North Carolina
South Carolina
Tennessee
Virginia

Southwest
Arizona
New Mexico
Oklahoma
Texas

Plains
Iowa
Kansas
Minnesota
Nebraska
North Dakota
South Dakota

Rocky Mountains
Colorado
Idaho
Montana
Utah
Wyoming

Far West
Alaska
California
Hawaii
Nevada
Oregon
Washington

The reader is warned that the data are subject to sampling error since they were obtained in a sample survey. (See app. B, Technical Notes, B and C.)

Item nonresponse is given in the tables except where it was negligible.

Chapter 2

Enrollment and Organization of Public Junior High Schools

GENERAL DATA REGARDING PUBLIC JUNIOR HIGH SCHOOLS were collected for the study to serve as background for analysis of science teaching practices. This information included number and distribution of schools, teachers, and pupils; organization of the school day; and length of the school year.

Schools

In the United States in the spring of 1963, approximately 3,100 public junior high schools had grades 7, 8, and 9, and no other grades (table 1, app. A). Schools with enrollments of 500–999 pupils constituted the single largest group, almost half of the schools surveyed. The small school (enrollment 1–499) was next most frequent, constituting a little more than a quarter of the junior high schools. Schools within the enrollment range of 1,000 to 1,499 made up the third largest group, with a little less than one-fifth of the schools. Together, the two middle-sized groups constituted almost two-thirds of the total schools. The largest schools, those with enrollments over 1,500, were found least frequently, representing about 7 percent of the Nation's public junior high schools. Thus, almost three-quarters of the public junior high schools had enrollments under 1,000.

The distribution of public junior high schools by geographic region showed that the largest numbers were found in the Southeast, with the Mideast ranking second (table 1). Schools with this grade range were least frequent in the Rocky Mountain States and in New England.

Teachers

The number of teachers, both full-time and part-time, for all schools represented in the study was estimated at about 110,900 (table 2). The distribution of teachers throughout the Nation more closely approximated the distribution of schools according to geographic region than it did the distribution of schools by school size group (tables 1 and 2, fig. 1).

About 50,400 of these teachers, a little less than one-half of the total, taught in schools with enrollments of 500–999, which comprised a little less than one-half of the total junior high schools. As shown in figure 1, the percents of teachers serving in schools in other size categories were not distributed as proportionately in relation to the numbers of schools. About 28 percent of the teachers worked in moderately large institutions (enrollment 1,000–1,499), which constituted about 19 percent of the schools. While the largest junior high schools made up only about 7 percent of the total schools, they employed 16 percent of the teachers. The small junior high schools, comprising about 28 percent of those in the Nation, had only 10 percent of the teachers.

Students

About 2,432,000 students were enrolled in the public junior high schools at the time of the survey (table 3). While few students (9 percent) were taught in a disproportionately large number of small schools (28 percent), about 43 percent of the students received their instruction in slightly more than one-quarter of the schools—those with enrollments over 1,000 (fig. 1). Thus, more than one-half of the students were registered in schools with enrollments under 1,000, which made up about three-fourths of the total schools. Almost 17 percent of the students were in the largest schools, with enrollments of 1,500 and over, although these constituted only about 7 percent of the total schools. The regional patterns of student enrollment re-

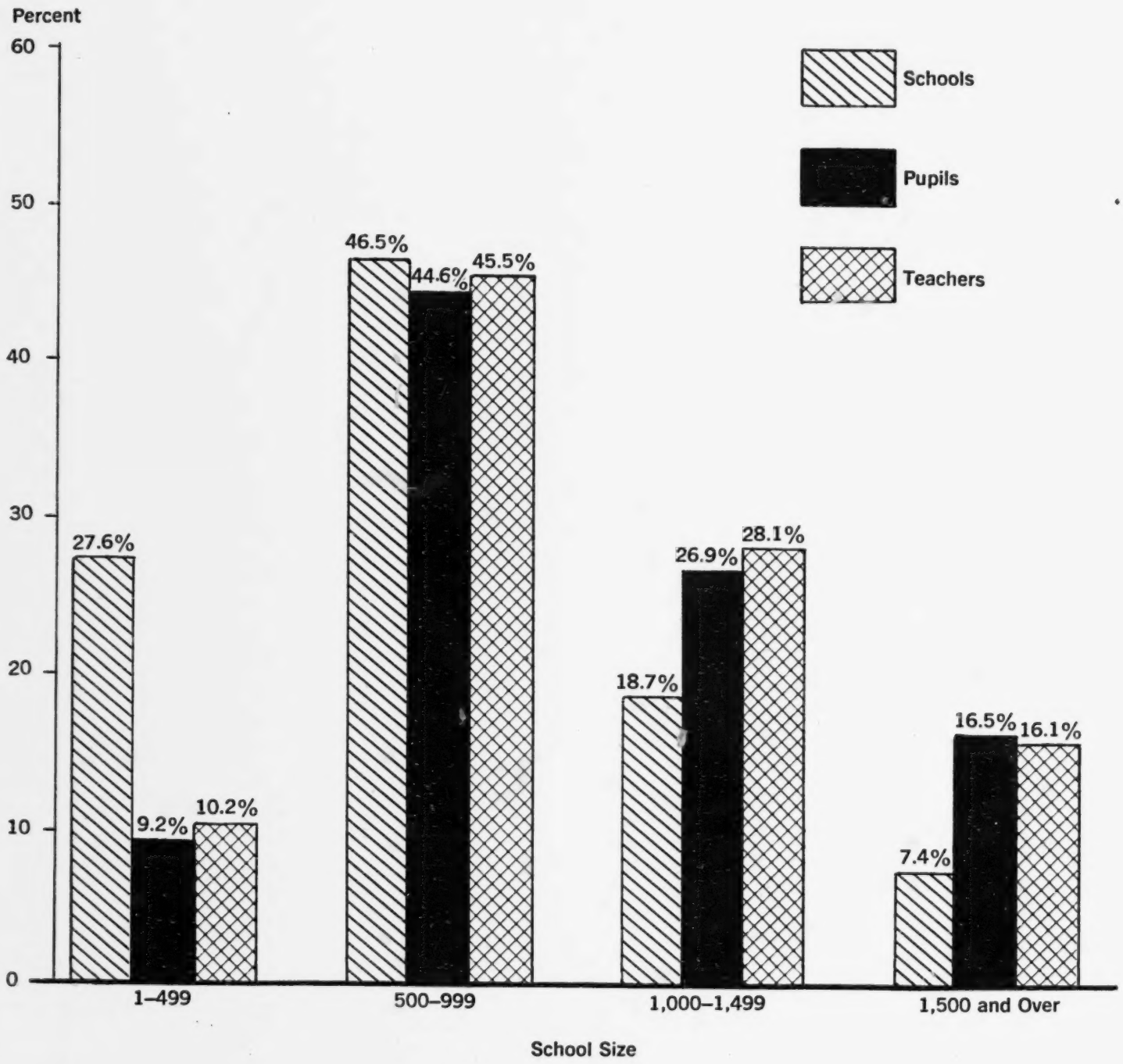

Figure 1.—Percent distribution of public junior high schools, pupils, and teachers by school size: United States, 1963

flected those of the distribution of schools, although the percentages were different.

Organization of the School Day

The school day was organized into class periods by nearly all of the responding schools (99 percent). However, somewhat fewer schools (93 percent) scheduled class periods for students in all three grade levels.

Item	*Percent*
Total schools	**100.0**
Separate class periods (any grade)	99.3
Separate periods: grades 7, 8, 9	92.5

The 6-period day was most frequent, with almost half of the schools using this organizational pattern (table 4). The 7-period day was the second most popular schedule, with a little less than one-third of the schools employing it.

Virtually all of the schools had at least five periods, while about 3 percent scheduled nine or more periods. The smallest schools tended to have the

fewest number of class periods. The greatest proportion of schools offering nine or more periods per day was in the middle-sized range. More than three-quarters of the schools in each of the enrollment groups over 500 had a 6- or 7-period day, compared with about two-thirds of the schools with enrollments under 500.

Length of Class Period

Almost all of the schools had class periods within the range of 38–62 minutes, with the 53- to 57-minute range being most common (table 5). The size of the school did not have an appreciable impact upon the length of class periods. However, the largest schools (1,500 and over) more frequently had a somewhat shorter class interval (48–52 minutes) than the others.

Length of School Year

For about 98 percent of the Nation's public junior high schools with all three grades, the range of days in the school year was between 165 and 195, with the most common range being 176–185 days, used by more than three-fourths of the schools (table 6). No school reported a school year of 164 or fewer days. At the extreme ranges in length of school year, the greatest number of short academic years was found in schools of the smallest size category, while the largest number of schools with the longest school years was found in the largest size group.

Chapter 3

Enrollment and Organization for Science

Science Course Offerings and Enrollments

ALL JUNIOR HIGH SCHOOLS reported offering science courses at some grade level; however, not all schools offered science courses at each grade level (table 7). In all enrollment size categories, the greatest number of schools offered science at the ninth-grade level, while the fewest offered it at the seventh-grade level.

Course offerings at various grade levels.—General Science is undisputedly the most common science course offered in the public junior high school, with about 94 percent of the schools scheduling it. Life Science-Biology courses were second most frequent, offered in almost one-quarter of the schools. Earth Science and Physical Science were each available in about one-tenth of the schools. Other course offerings were found in a very small percent of the schools.

There was an increase in the percent of schools offering General Science in the eighth grade (87 percent) compared with the seventh (78 percent), but the increase was not progressive throughout the three grade levels. Both Life Science-Biology and Earth Science were most frequent in the ninth grade, but were found in less than one-fifth of the schools at that grade level. Each of these courses was available at the lower grades in about 5 percent, or less, of the total schools. Life Science-Biology was least available in the eighth grade, while Earth Science showed a progressive increase in frequency from the seventh grade to the ninth. Health Science, although offered by only a small percent of the schools, was most frequent in the eighth grade and least frequent in the ninth. Earth-Space Science, scheduled by relatively few schools, was not reported by any school for the seventh grade. Space Science was the least frequent of the course offerings. Other types of science courses, including various combinations, were found in a small percent of the schools.

Course offerings and size of school.—The size of the school appeared to have an impact upon the nature of the course offerings, except for General Science which was found in at least 92 percent of all the schools in all size groups (table 7). All other courses showed a marked decrease in percent occurrence in the smallest schools (enrollment 1–499). However, progressive increase in school size did not necessarily indicate a progressive increase in the number of course offerings, for a greater percent of schools in the middle-sized group offered Life Science-Biology and Space Science than did schools in the largest size group.

Science enrollment and school size.—The number of pupils enrolled in science classes reflected 77 percent of the total enrollment in the public junior high schools surveyed (table 8). The largest percent of pupil enrollment in science (90 percent) occurred in the smallest schools. Schools with enrollments from 500 to 999 ranked second in percent of the student body enrolled in science. Those with enrollments over 1,000 ranked third. There appeared to be a converse relationship between the enrollment size of the school and the percent of student enrollment in science.

Figure 2 shows the percentage of pupils enrolled in selected science courses according to school size.

While General Science enrolled 67 percent of all junior high school students, enrollments in Life Science-Biology, Physical Science, and Earth Science were far less, ranging from 1 to almost 4 percent. Only in schools of the largest size were the enrollments in these three courses approximately the same. However, the greatest percent of students en-

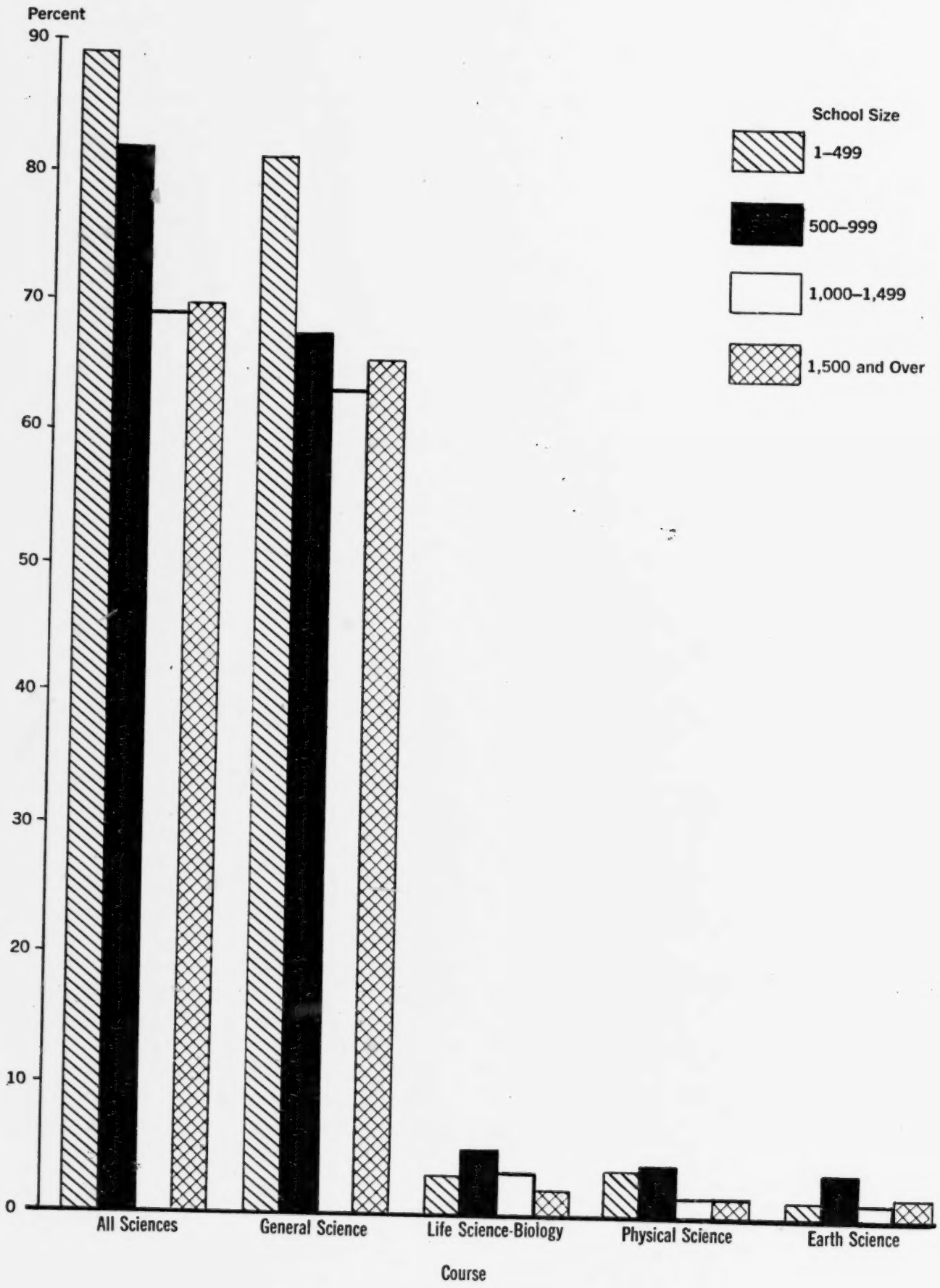

Figure 2.—Percent distribution of public junior high school students enrolled in selected science courses, by school size: United States, 1963

rolled in these three courses was found in schools of 500–999 enrollment. Other courses had enrollments of 1 percent or less of the students.

Science enrollment and geographic region.—A greater percent of students was enrolled in science courses in New England junior high schools than in any other part of the Nation. From New England's high of 95 percent, the figures dropped to a low of 53 percent in the Far West.

Table A shows the comparative enrollment in various science courses in the eight geographic regions:

Table A.—Percent of public junior high school students enrolled in selected science courses, by geographic region: United States, 1963

Science course	Geographic region								
	All regions	New England	Mideast	Great Lakes	Plains	Southeast	Southwest	Rocky Mountains	Far West
Total pupils	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
All courses	**77.2**	**95.2**	**89.8**	**74.8**	**78.3**	**84.9**	**70.7**	**78.6**	**53.2**
General Science	66.9	87.0	83.0	65.5	58.9	77.8	44.0	63.7	50.7
Life Science-Biology	3.6	4.0	2.1	4.8	7.6	1.7	6.0	7.9	.9
Physical Science	2.3	.0	.4	.8	6.2	1.3	9.0	4.8	.7
Earth-Science	2.0	3.7	2.1	1.0	4.1	.9	5.6	.5	.3
Space Science	.0	.0	.1	.0	.0	.0	.0	.0	.1
Earth-Space Science	.3	.0	.5	.0	1.3	.1	.0	.0	.1
Health Science	.9	.4	.1	2.3	.2	1.3	2.4	.0	.3

Since the enrollments in courses other than General Science were relatively small, few significant course trends could be discerned on a regional basis. Space Science courses were reported only in the Mideast and Far West, while Earth-Space Science was taught in the Mideast, Plains, Southeast, and Far West. Health Science was *not* reported in the Rocky Mountain States.

Science Teaching Personnel

The approximately 14,700 science teachers in the public junior high schools of the Nation constituted 13 percent of the total instructional staff of almost 111,000.

School size	Teachers			
	Classroom		Science	
	Number	Percent	Number	Percent
All sizes	**110,885**	**100.0**	**14,736**	**100.0**
1–499	11,519	10.2	2,180	14.9
500–999	50,389	45.5	7,036	47.9
1,000–1,499	31,197	28.1	3,588	24.4
1,500 and over	17,780	16.1	1,933	13.1

Almost one-half of the junior high school teachers with science assignments were employed in schools within the enrollment range of 500–999. In comparing the number of science teachers with the total instructional staff, two reverse patterns appeared in the schools, with 1,000 enrollment serving as the demarcation line. Schools with enrollments under 1,000 reported a total of 56 percent of all public junior high school teachers, but had a comparatively higher percent of science teachers (63 percent). Schools with enrollments over 1,000 employed 44 percent of the total junior high school teachers, but had only 38 percent of the science teachers. Hence schools with enrollments under 1,000 had proportionately more science teachers.

As shown in table B, the largest group of science teachers in all school sizes taught between 21 and 25 periods per week, with a wide distribution from the 1–5 period to the 36–40 period range. Almost a third of the science teachers spent 10 hours or fewer in science instruction per week, thus teaching only one or two classes of science where such instruction was on a daily basis. With 78 percent of the schools having a 6- or 7-period day, the *maximum* number of instructional hours should range upward from 30 hours per week. Teachers who taught science 31 or more hours per week constituted only about 3 percent of the total number of science teachers. Those who were involved in science instruction for 26 or more hours per week made up only 13 percent of the total. Thus, relatively few junior high school science teachers were assigned to full-time science instruction.

As indicated in table 9, teachers in New England, the Mideast, and the Plains States instructed a greater number of periods of science per week than the national average (21–25 periods per week). In contrast, science instructors in the Southeast most frequently taught science from 1 to 5 periods per

Table B.—Percent of classroom teachers who teach science in public junior high schools, by number of periods of science taught per week, and by school size: United States, 1963

Number of science periods	School size				
	All sizes	1-499	500-999	1,000-1,499	1,500 and over
Total science teachers	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
1 to 5	18.7	28.4	17.9	18.3	11.6
6 to 10	12.7	21.3	14.0	7.9	7.3
11 to 15	9.6	14.0	9.6	9.0	6.0
16 to 20	10.3	13.0	10.5	8.3	10.1
21 to 25	36.0	15.1	34.2	43.8	51.6
26 to 30	9.9	6.0	11.5	10.4	7.3
31 to 35	1.8	2.8	.9	1.9	3.7
36 to 40	1.1	.0	1.4	.4	2.4

NOTE.—Because of rounding, percents may not total 100.0.

week, and thus appeared to have more diverse teaching assignments. Only about one-quarter of the Southeast teachers had science assignments within the average range for the Nation, compared with 36 percent of the Nation's teachers. In contrast, more than half of the science teachers in the Plains States taught within the average range for the Nation.

Class Size

Class size is a vital element of concern in science instruction because of its relation to the feasibility of laboratory-type activities. The mean class size for all junior high school science courses offered throughout the Nation was 29 (table 10). The average class size of the more frequent science courses offered showed only a small range, from 33 pupils in Earth-Space Science to 28 in Life Science-Biology. Only Space Science showed a considerably smaller mean (23 students). In all science courses, the mean class size increased with school size. Thus, the largest schools had the largest science classes.

For several courses, enrollment means showed slight progressive decreases from seventh to ninth grades, as did the total means for all science courses. The course which indicated a reversed trend, a marked progressive increase in average size from the seventh to the ninth grade, was Space Science.

The smallest science classes (a mean of 24 pupils) were found in the Southwest, while the means for all other regions were within a range of almost 29 to about 31 pupils, with the largest being found in the Far West (table 11). These enrollment patterns were not reflected by all of the individual courses, however. New England and the Far West had the smallest classes in Life Science-Biology, while the Southeast and Rocky Mountains had the largest. With a mean of 42 students for Earth-Space Science, the Midwest had the largest size of any science course in any region. However, the Far West was not far behind with a mean of 41 for Health Science courses, in contrast to a low of 27 in the Plains States. Space Science was reported by only two regions, with a great contrast between a mean of 18 students in the Far West and that of 33 students in the Mideast. Five of the eight regions had class size means which were below the national average for all classes.

Although there was a difference of approximately seven students between the largest and smallest regional means for all science courses, no one region appeared to be consistent in its rank of mean sizes for all science courses. Most regions reflected patterns of variation in which some courses had high means while others had low means in relation to those of other regions.

High School Graduation Credit

Seventy-eight percent of those schools which offered General Science granted high school graduation credit for the course at some grade level (table 12). For Physical Science and Life Science-Biology, about 70 percent granted such credit. The course which least often carried graduation credit was Health Science; such credit was given by only 15 percent of the schools which offered the course.

The data indicated that relatively few schools granted high school graduation credit at the seventh- and eighth-grade levels, in comparison to the ninth grade, which is considered the high school freshman year. Some schools offered credit for each of the science courses in the ninth grade; but at the

seventh- and eighth-grade levels, graduation credit was not reported by any school for Space Science, Earth-Space Science, and Health Science.

Grouping

Frequency.—Homogenous grouping in science was practiced in at least some grade by about 60 percent of the total junior high schools (fig. 3). However, only about two-thirds of the schools which grouped

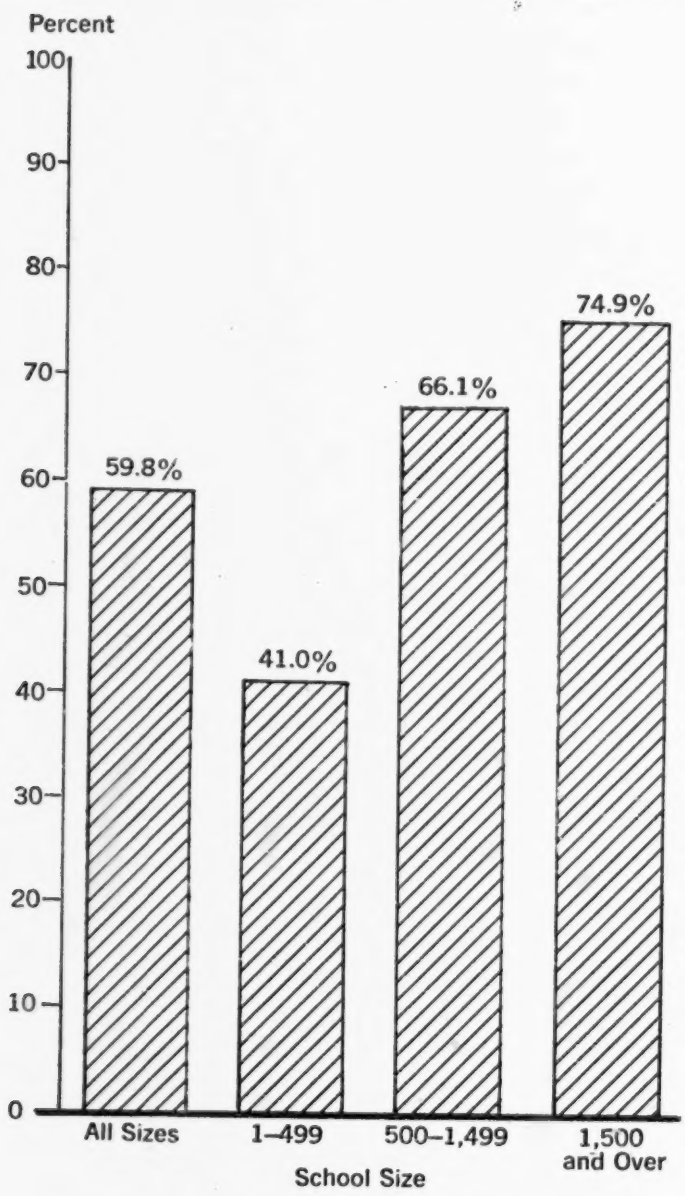

Figure 3.—Percent of public junior high schools using grouping for science classes, by school size: United States, 1963

used the practice in all three grades. Less than 10 percent of these schools used grouping at only one particular grade or for a particular two-grade combination, as shown:

Grade	*Percent*
All three grades	66.9
Single grade only:	
Grade 7	9.1
Grade 8	1.5
Grade 9	7.6
Two-grade combinations:	
Grades 7 and 8	6.4
Grades 7 and 9	1.3
Grades 8 and 9	5.1

There was a close association between school size and grouping for science instruction. Forty-one percent of the smallest schools grouped at some grade level, compared to 75 percent of the largest schools. About two-thirds of the institutions in the intermediate enrollment range used such grouping. Thus, as figure 3 indicates, the data showed an increased use of grouping as school size increased.

Criteria.—The most frequent bases for grouping for science instruction were teacher recommendation and intelligence tests, each cited by at least 90 percent of the responding schools. Achievement tests and previous marks were listed by slightly smaller proportions of the schools, and aptitude tests were used as criteria by more than one-third of those schools which indicated a basis for grouping. Multiple factors appeared to be considered in grouping for science instruction by most schools, as indicated by the marking of more than one criterion.

The use of selected criteria for grouping in science is shown in figure 4.

The use of various criteria for grouping was roughly comparable for the different school size groups, as indicated below:

Criterion	School size		
	1–499	500–1,499	1,500 and over
Schools responding	**100.0**	**100.0**	**100.0**
Teacher recommendation	86.8	91.1	87.1
Intelligence tests	84.8	90.8	94.4
Achievement tests	83.7	87.7	84.4
Previous marks	76.0	88.4	88.2
Pupil interest	62.4	66.1	65.0
Aptitude tests	28.3	45.5	26.2
Parent recommendation	13.0	34.6	27.5

The use of aptitude tests was greatest in the middle-sized schools, and nearly equal in the smallest and the largest. Parent recommendation was considered more than twice as frequently in the large schools as in the small ones. The data revealed that the smaller schools generally used fewer criteria for homogeneous grouping in science than did the larger ones.

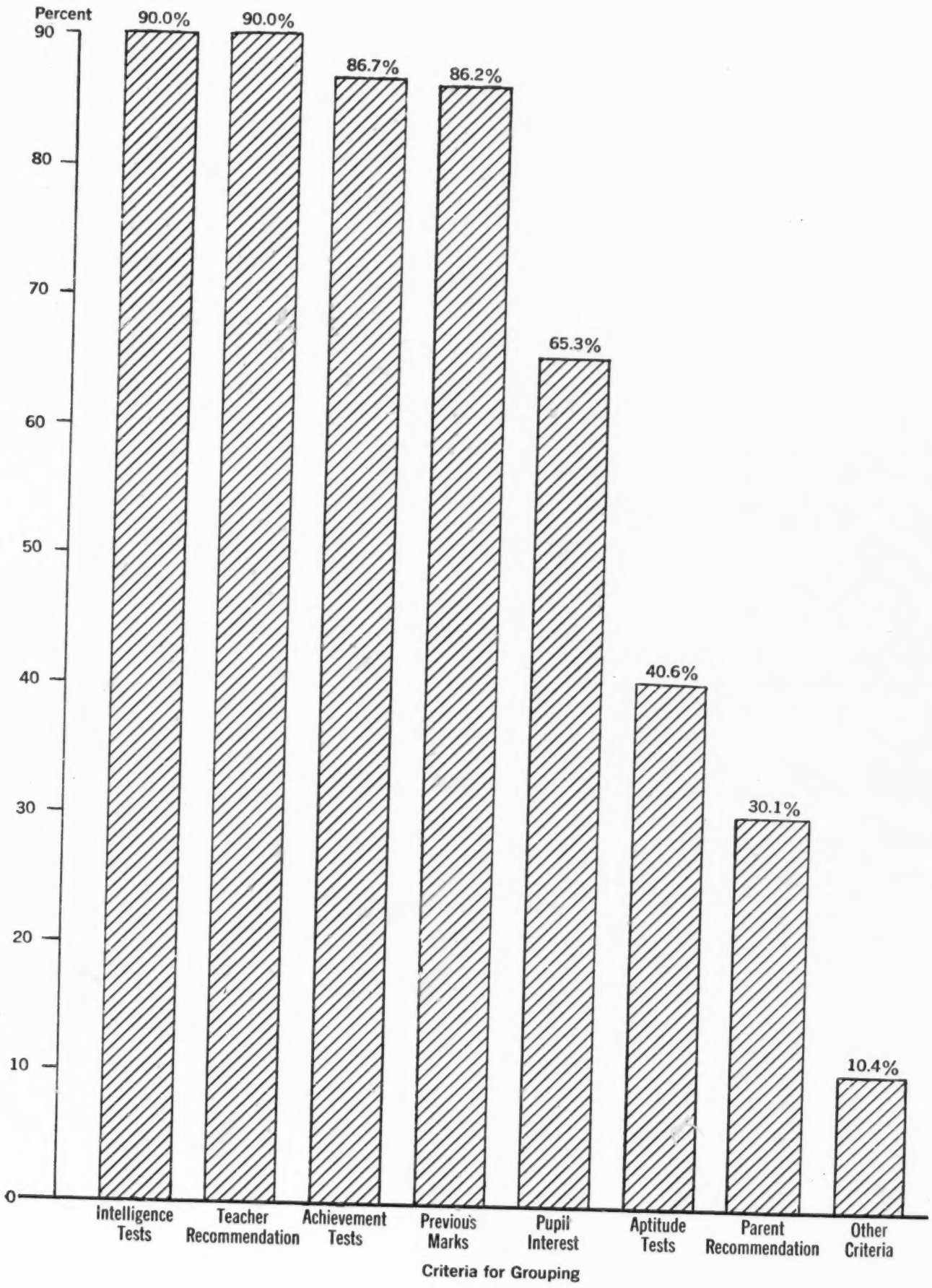

Figure 4.—Percent of public junior high schools using certain criteria in grouping for science instruction: United States, 1963

Changes anticipated.—As table C shows, over 70 percent of the schools surveyed indicated that the emphasis upon grouping within the ensuing 2-year period would remain the same. A quarter of those schools responding to the question reported planning more emphasis upon grouping in the future, while a very small percent indicated less emphasis. Thus, it would appear that, although about 60 percent of the junior high schools used some grouping for science instruction, the trend was toward increasing the practice.

About 30 percent of the smallest schools grouping at the time of collection of data reported planning to increase their emphasis. This size group not only had the least grouping for science instruction, but also had the greatest percentage of schools planning to increase the emphasis on grouping. Of the schools which reported *not* using grouping for science instruction, there was a progressive increase, with increase in school size, in the percent planning additional emphasis for such grouping.

Table C.—Percent of public junior high schools anticipating changes in emphasis in homogeneous grouping for science classes during ensuing 2-year period: United States, 1963

Grouping practice and emphasis	School size			
	All sizes	1–499	500–1,499	1,500 and over
Grouping in any grade..	100.0	100.0	100.0	100.0
More emphasis.....	24.9	30.5	23.7	23.3
Less emphasis.....	2.7	3.0	2.8	1.9
Same emphasis.....	72.4	66.5	73.5	74.8
Nonresponse.....	.0	.0	.0	.0
No grouping.....	100.0	100.0	100.0	100.0
More emphasis.....	30.7	24.0	34.3	42.1
Same emphasis.....	68.1	75.2	64.7	51.7
Nonresponse.....	1.2	.8	1.0	6.2

Chapter 4

Instructional Resources for Science

Textbooks

Use.—Virtually all of the schools used textbooks for science instruction at some grade level, but only 80 percent used them at all three grade levels (table 13). Science textbooks were used to a greater degree in eighth- and ninth-grade classes than in the seventh grade. No school reported the use of textbooks exclusively for seventh-grade science instruction, although a few schools used them only for eighth- or for ninth-grade science courses.

The percent of schools reporting use of science textbooks at all three grade levels increased as school size decreased: about nine-tenths of the smallest schools, but less than two-thirds of the largest schools, indicated such a practice. Over 95 percent of all schools used science textbooks for both eighth and ninth grades.

Use of a single textbook seemed to be the prevailing practice, for it was reported in all three grades by almost 60 percent of the schools. This practice was most frequent with the older students, although their age and experience should have made them more competent to handle additional material.

About one-half of the schools used a coordinated series for all three grades, displaying a decreased use with an increase in school size. Coordinated textbooks series were used in at least two grades by more than one-half of the schools, with considerably more of the smaller schools using them than the larger ones. The most frequent two-grade combination for use of series textbooks was eighth and ninth, although the percent was small compared to the use of a series in all three grades. Thus, if a junior high school used textbooks from a coordinated series at all, it would most likely use them in all three grades.

Distribution.—More than three-fourths of the schools used student loan as the sole means of science textbook distribution (table 14). There was a somewhat greater percent of loan activity in the eighth grade, although more than half of the schools used student loan exclusively in all three grades. More than 90 percent of the public junior high schools in the Mideast, Southwest, and Far West used student loan exclusively (table 15). It was least common in the Southeast and Great Lakes regions.

Slightly more than one-tenth of the schools reported textbook rental as the sole means of distribution in at least one grade. The practice was a little more frequent in the higher grades. The largest schools used textbook rental to only an insignificant degree. The rental practice was most frequent in the Great Lakes, the Plains, and the Rocky Mountain States, with each region using it in somewhat less than one-third of the schools. Textbook rental was not reported in the New England States, and by only an insignificant percent of the schools in the Southwest and Far West.

Pupil textbook purchase, as a sole means of distribution, was reported in a rather small percent of the schools, none of which had enrollments over 1,500. It was most frequent in the smallest schools. Schools in only two regions used the practice exclusively. In the Plains States this was a relatively insignificant number. In the Southeast, however, the practice was the sole means of distribution in one-quarter of the schools.

Combinations of various means of textbook distribution were little used. They were frequent in the smallest schools and nil in the largest ones.

Recency.—Because of the continuing rapid expansion of knowledge in the field of science, recency of science textbook publication is more important than in most other fields of instruction. Table D

Table D.—Percent of public junior high schools by most recent copyright date of science textbooks used and by course: United States, 1963

Course	Textbook copyright date						
	Total schools	1962 or later	1959–61	1956–58	1953–55	1950–52	Before 1950
General Science	100.0	12.6	55.3	19.0	1.5	0.4	0.4
Life Science-Biology	100.0	6.4	52.7	13.3	2.2	2.9	.0
Physical Science	100.0	16.2	53.4	17.0	1.1	1.0	.0
Earth Science	100.0	7.3	76.3	3.7	.9	.0	.0
Earth-Space Science	100.0	.0	38.5	19.3	.0	.0	.0
Health Science	100.0	.0	40.5	28.8	1.5	.0	.0

indicates that at the time of the study more than 50 percent of the schools were using some science textbooks 2 to 4 years old (published between 1959 and 1961) in the four most common science courses. The proportion of schools then using new textbooks (published in 1962 or later) in General Science, Life Science-Biology, and Physical Science was only slightly less than that of schools using volumes 5 to 7 years old at that time. Although a very small percent of schools reported using science textbooks 8 or more years old, some indicated use of volumes published more than 14 years previous to the study. If the great lag in getting research information into textbooks is considered, a substantial proportion of the junior high schools were not providing up-to-date information for their science students.

Schools using some General Science textbooks published from 1959 to 1961 (2–4 years old at the time of the study) constituted over half of the total. Those with enrollments under 500 were the only ones reporting the use of such textbooks published before 1950 (table 16). The largest schools appeared to be using some of the newest textbooks for General Science.

While about 6 percent of the schools used some Life Science-Biology textbooks published in 1962 or later, none of these were schools with enrollments under 500. In contrast, more than 25 percent of the largest schools were using the newer books. More than half of the schools in all size groups reported use of Biology-Life Science textbooks which were 2 to 4 years old at the time of the study.

Although 16 percent of the schools reported using some newly published Physical Science textbooks, the largest percent (23 percent) of these were schools in the smallest size group. Only a few schools, in the middle-sized group, used Physical Science textbooks which were published before 1956.

Less than one-tenth of the schools had Earth Science texts published in 1962 or later, but more than three-fourths had books published from 1959 to 1961. This was the largest proportion of recent publication dates reported for textbooks in any science course. One-tenth of the largest schools had Earth Science textbooks which were published from 1953 to 1955, but no schools in the other size groups reporting having textbooks published prior to 1956.

The number of schools offering Earth-Space Science was fairly limited, and a large proportion of them did not report using a textbook for the course. However, close to 40 percent of those reporting used textbooks which were published from 1959 to 1961. None reported use of Earth-Space Science texts with publication dates prior to 1956.

A greater proportion of schools reported using older textbooks in Health Science than in any other science course. Almost one-third of the schools used Health Science textbooks published from 1956 to 1958. The newest textbooks were found in Earth Science courses. The larger schools more often than the smaller ones used newer science textbooks.

Supplementary Materials

Locally prepared resource material.—Resource material for science instruction used in place of a textbook and prepared by local teachers was reported in a little over one-tenth of the junior high schools, although not all of these indicated its use in all three grades (table 17). The largest and smallest schools reported the greatest frequency of use, while those with enrollments from 1,000 to 1,499 used it the least. The data shows a progressive increase in use from seventh to ninth grade, irrespective of school size. It would thus appear that relatively few schools utilized material which could specifically adapt science content to local needs.

Commercial workbooks.—Slightly more than one-

quarter of the schools in the country used commercial workbooks for junior high school science instruction. Although more than one-third of the small schools used them, there was a progressive decrease as the school size increased, with less than one-fifth of the largest schools using them. Considerably more than twice as many of the small schools used them in all three grades as schools in any other size category. Use at all three grade levels was limited to 12 percent of the schools sampled. However, a progressive *increase* in use from the seventh to the ninth grade was reported.

Although the new curriculum projects in science education indicate the desirability of innovative research for students at all grade levels, about one-quarter of the schools used workbooks, which are highly directive in nature, for the ninth graders. This was an increase of 10 percent over use in the seventh grade. It would thus appear that workbook usage, particularly for the older students, may need to be reevaluated.

Locally prepared worksheets.—Worksheets prepared by local teachers were used in almost two-thirds of the schools, although somewhat less than half of the schools used them for all three grades. A pattern of progressive increase in use with rise in grade level was apparent. Schools in the middle-sized group made the greatest use of these worksheets.

All supplementary material showed progressive increase in use with increase in grade level. Locally prepared student worksheets were the most frequently used, while locally prepared resource material was least used. Considerably more small schools used workbooks, and somewhat more used locally prepared resource materials, than did the larger schools.

Published Reference Materials

School library materials.—The percent of schools with libraries increased with the increase in school size group, as follows:

All sizes	94.3
1–499	90.3
500–1,499	97.2
1,500 and over	98.7

Although 94 percent of the junior high schools reported having school libraries, and some schools without them indicated the existence of reference materials, a few schools reported the existence of no reference materials (table 18). Since about 96 percent of the schools reported having both general and science reference books it would appear that, if reference volumes were available, materials on science were included.

A total of 85 percent of the schools rated their general reference collections as *good* or *excellent*. However, less than 70 percent rated their science reference collections in the same way. Reference collections in science were not as good as those of a general nature, and in some aspects were in critical need of improvement.

Science books, other than adopted texts, were present in almost the same proportion as science reference materials. Somewhat fewer schools rated their collections of science books *good* or *excellent* in comparision with collections of science reference books.

Weekly science newsletters and similar periodicals were available in 87 percent of the schools, indicating that not all libraries subscribed to them. Less than two-thirds of the schools rated their collections of such periodicals as *excellent* or *good*. Of the three-fourths of the schools receiving scientific journals, about one-half felt that the adequacy of their collections could receive an *excellent* or *good* rating. This was in contrast to popular science magazines available in over nine-tenths of the schools, with almost three-quarters of the schools considering their collections to be *excellent* or *good*. Professional science teaching periodicals were available in less than two-thirds of the schools, with about one-third of these rating the adequacy of their subscriptions in the *excellent* or *good* categories. In order of descending frequency of *excellent* and *good* ratings of school collections were the following types of periodicals: popular science magazines, weekly science magazines, scientific journals, and professional science teaching periodicals. The more limited availability of the latter, which could have a profound impact upon science instruction in the classroom, would seem to imply that a substantial number of schools were not providing one kind of teacher resource material which could contribute toward real improvement in science instruction.

Paperback books in science were found in almost two-thirds of the junior high schools. Although they provide one of the most economical sources of science reference material, less than one-tenth of the schools rated their collections as *excellent*, while less than one-fifth considered them *good*. Acquisition of additional paperback science books would seem to be one way of upgrading school science reference collections at a limited cost.

The mean number of titles[1] of science-related books, other than textbooks or encyclopedias, for the public junior high schools of the country was approximately 450 (table 19). Size of school was definitely correlated with the number of titles available, with a mean of 240 titles for the smallest schools and 668 for the largest ones. Less than 7 percent of the small schools had more than 400 titles, in contrast to over half of the large schools. Thus, students attending large schools had considerably more science reference material with which to work.

The mean number of books for those schools which rated their science reference collections as *excellent* was 705. However, as table E illustrates, there was a relatively small difference in the mean number of books in those schools which considered their collections *good* to *excellent* (464) compared with those which rated them *fair* to *good* (418). This pattern generally was true regardless of school size. Thus, the school's adequacy rating of its science reference collection seemed to be related to quality as well as quantity.

Table E.—Mean number of titles of science-related books in public junior high schools, by school's adequacy rating of science reference material, by school size: United States, 1963

Adequacy rating	School size				
	All sizes	1–499	500–999	1,000–1,499	1,500 and over
Total schools	449.2	239.9	454.6	616.2	665.8
Excellent	704.5	603.8	601.9	875.5	943.5
Good to excellent	464.4	231.1	469.0	605.2	583.1
Fair to good	417.6	219.1	438.9	546.2	607.6
Poor to fair	238.0	131.5	288.1	414.2	373.1
Poor	112.2	30.7	105.5	196.4	350.0

As might be anticipated, the adequacy rating also reflected the size of the school. The average number of books in collections which received an *excellent* rating by small schools was approximately 600, compared to about 940 in the largest schools. The average size of collections judged to be *poor* by the small schools was about 30, compared with 350 for the largest schools.

The data show that attention needs to be given to improving the science collections in school libraries. This is especially true in the smaller schools which consistently rated any one aspect of the science library collection lower than did schools in any other size group. School size, however, did not seem to be the determining factor in the status of various facets of the science collection. An even smaller percent of the largest schools provided professional science teaching periodicals than did the smallest schools.

Classroom reference materials.—General references and/or science textbooks other than adopted texts were available in the science classroom in 98 percent of the schools, with 92 percent providing both (table 20). The size of the school seemed to have little effect upon the availability of such materials. More than one-tenth of the schools rated such classroom collections as *excellent*. Only in the smallest schools was the fraction substantially lower. About half of the schools considered their collections to be *excellent* or *good*. In virtually all size groups, the adequacy rating most often given to either general reference material or to science textbooks other than adopted texts was *good*.

The availability of reference material from outside the classroom for use therein was considered *excellent* by only about one-fifth of the schools. Approximately two-fifths rated it *good*. For 16 percent of the schools such materials were either not available or were given a *poor* rating. The data seemed to indicate that even in some schools where reference materials was available it could not be used in the science classroom and, furthermore, that a relatively small percent of the schools had excellent reference material readily available for use in these classrooms.

Audiovisual Aids

Audiovisual aids are particularly important in science instruction, yet they were not available in a surprisingly large proportion of schools (table 21). Although cost could be a limiting factor, it did not always appear to be the determining one. The two most inexpensive aids listed on the questionnaire (homemade charts and flannelboards) were readily available in less than half and less than one-quarter, respectively, of the schools. Teacher time and creativity would hence appear to be limiting factors.

Slide/filmstrip projectors were the most common visual aid for science instruction, with more than nine-tenths of the schools having them readily available. However, only one-tenth of the schools had filmstrips readily available, and a negligible

[1] Exclusive of duplicate copies with the same title.

percent had them available on a limited basis. This would indicate that, even when the equipment was available, materials for use on the equipment might not be.

Sound motion pictures were readily available for science instruction in about four-fifths of the schools. Silent motion pictures were not nearly as prevalent, being readily available in somewhat less than half of the schools, but *not* being available for use in well over one-third of the schools.

Although micro- and opaque projectors were readily available for science instruction in about 70 percent of the schools, they were not available at all in at least 18 percent. Commercial models and charts, which are somewhat unique to science instruction, were readily available in around 60 percent of the schools, although they could be obtained in at least another 20 percent. Roughly 50 percent of the schools made commercial pamphlets, overhead projectors, and flannelboards readily available.

In spite of the fact that educational television broadcasts in science were among the first presented, only slightly more than one-quarter of the schools were well equipped to receive them in science classrooms. Approximately one-quarter had limited access to television receivers, while almost half had no receivers. In spite of the advances in and attention given to educational television, it did not appear to be used extensively in junior high school science instruction.

Over 90 percent of the schools did *not* have closed circuit television, while less than one-twentieth had it readily available for science teaching. It would thus appear that its use in the junior high school, in the area of science, was extremely limited, except in large schools with enrollments over 1,500 of which about 11 percent had this medium readily available.

Facilities and Equipment

Classrooms and laboratories.—About seven-tenths of the public junior high schools of the country, serving three-fourths of the students, provided combination classroom-laboratories, while about one-tenth of the pupils had access to separate recitation rooms and laboratories (table 22). Although science is a laboratory-oriented subject, and experts in the field feel that students can learn best through first-hand experience, as table F indicates, more than a quarter of the junior high schools of the Nation did not provide laboratory facilities for science instruction.

Table F.—Percent of public junior high schools having selected science facilities, by school size: United States, 1963

Facility	School size				
	All sizes	1–499	500–999	1,000–1,499	1,500 and over
Total schools	100.0	100.0	100.0	100.0	100.0
Combination classroom laboratory	70.5	69.3	69.9	73.8	70.9
Separate recitation room and laboratory	8.5	11.3	8.6	4.9	6.8
Either (of above)	74.4	75.2	73.9	75.3	72.7
No laboratory[1]	25.6	24.8	26.1	24.7	27.3
Room primarily equipped for nonscience teaching	27.3	27.0	27.7	21.8	40.3

[1]Schools having neither combination classroom-laboratory nor separate recitation room and laboratory facilities.

The percent of small schools which had only combination classroom-laboratories was fairly close to that of the large schools. Size appeared to have a bearing on the availability of facilities when laboratories were separate, accompanied by recitation rooms. A greater proportion of the small schools maintained separate laboratory facilities.

The largest percent of schools without laboratories had enrollments over 1,500. In the Nation as a whole, more than a quarter of the public junior high schools students received their science instruction in rooms that were primarily equipped for teaching in other subject areas. About 40 percent of the largest schools used such rooms for science instruction. Thus, the largest schools appeared to have done the poorest job of providing facilities for science instruction.

The availability of instructional facilities seemed to relate to the science course offered (table 23). General Science and Physical Science had the greatest proportion of combined classroom-laboratory facilities, since these were provided in more than 70 percent of the country's schools which offered the courses. In comparision, Life Science-Biology had combination facilities in 65 percent of the schools offering such courses. Earth Science and Earth-Space Science had such facilities in about 60 percent of the schools, while about 40 percent had the combination classroom-laboratories for Health Science.

In General Science there was an increase in the availability of the combination classroom-laboratory facilities from the seventh to the ninth grade. Almost the reverse was true for Physical Science,

for about 95 percent of the schools provided such facilities for the seventh graders, but the percentage dropped considerably (to approximately 70 percent) for the two higher grades, eighth and ninth. In Life Science-Biology courses, laboratory facilities were available in more than 60 percent of the schools for the seventh and ninth graders, but the percentage dropped significantly at the eighth-grade level (43 percent). Three-fourths of the schools had combination classroom-laboratory facilities for Earth Science in the eighth grade, in comparison to about one-quarter in the seventh and more than one-half in the ninth. For Health Science two-thirds of the schools provided combination classroom-laboratories in the seventh grade, but none reported them available in the ninth grade. Thus, availability of facilities was related to the particular science course since no grade level pattern was applicable to all courses.

Utilities in science classrooms.—More than nine-tenths of the schools reported water, gas, and electricity available in the science classroom for teacher demonstration (table 24). The greatest percent of science facilities without such utilities was in small schools. Electrical outlets were most frequently reported as available, while the least available utility was gas, which was reported in 83 percent of the small schools, compared to 98 percent of the largest schools. Although all schools with enrollments over 1,500 reported the existence of electrical outlets for teacher demonstration in science rooms, a scattering of small schools reported the absence of the utility. The data thus indicated that, although the smaller schools had fewer utilities for teacher demonstration, most schools provided them.

About one-quarter of the Nation's public junior high schools had all three utilities—water, gas, and electricity—available at pupil laboratory tables. In the remaining three-fourths of the schools, electricity was the most frequent utility, water least frequent. The size of the school generally was associated with the provision of these utilities. The availability of utilities at pupil laboratory tables *decreased* as school size increased. With slightly less than one-third of the small schools providing all three utilities, compared to less than one-fifth of the largest schools, it would appear that a larger proportion of the smaller schools were in a better physical situation to encourage student laboratory activity. Virtually all schools which provided the utilities for pupil laboratory tables also had them available for teachers.

Storage.—Adequate storage is critical for science instruction because of the large volume of equipment and supplies needed for laboratory work. Only three-quarters of the schools provided separate science storerooms, while two-thirds reported having *both* science storerooms and classroom cupboards (table 25). About one-tenth reported *no* cupboard space available in the classroom. Separate science storerooms were far more common in the largest schools (over 90 percent) than in the small ones (56 percent). A greater proportion of the largest schools also provided classroom cupboard storage.

Special facilities and equipment.—Special facilities and equipment for science instruction were found more often in the largest schools (table G). However, the percentage of small schools reporting school planetaria was approximately the same as that of the largest institutions—both slightly above the national average of 12 percent of the total schools. While about three-fourths of the students in the large schools had planetaria "within reasonable travel distance," this was true for only about one-half of the middle-sized schools and for less than one-quarter of the small schools. Weather equipment was available in more than one-half of the Nation's schools, housing for small animals in about one-third, but greenhouses in only one-twentieth.

Table G.—Percent of public junior high schools having certain science facilities and equipment: United States, 1963

Type of facility	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	100.0	100.0	100.0	100.0
Weather equipment	55.5	49.4	57.3	62.6
Planetarium within reasonable travel distance	43.1	23.6	47.9	74.0
Housing for small animals	33.9	23.1	36.8	48.7
School planetarium	12.0	14.9	10.4	15.4
Greenhouse	5.5	1.7	6.3	12.6

The topic "animals" was included in General Science (the most frequently offered course) by close to 90 percent of the schools, yet as table G indicates, only one-third of them were equipped to maintain some type of small animal life in the science classroom. Thus, if the existence of housing for small animals is any indication, many schools are not adequately equipped for science instruction.

The types of facilities listed in table G appeared to be the ones most frequently available. Less than one-tenth of the schools indicated that they had facilities other than those listed.

Chapter 5

Funds for Science

National Defense Education Act Funds

Use of funds.—Less than one-third (30 percent) of the total schools reported use of National Defense Education Act funds for remodeling science facilities, while about 82 percent reported equipment purchases with NDEA assistance, as shown in table H. Virtually all schools which reported such assistance for remodeling also reported NDEA aid for equipment purchases. Thus, most of the schools which did not purchase equipment with NDEA money did not use this Federal assistance for science facility remodeling either.

As also shown in table H, although there was a relatively small difference in the percent of schools in various size groups using NDEA funds for remodeling, there appeared to be a progressive increase in such usage with increase in school size. Thus, a smaller proportion of the smallest schools used such funds, while a larger proportion of the largest ones used them. Equipment purchases showed a reverse pattern: Small schools constituted the greatest percent of any school size group using NDEA funds for this purpose, while the largest schools constituted the lowest percent.

Use of NDEA funds varied considerably by geographic region. The greatest use of such funds for science facility remodeling was in the Plains States, followed by the Southeast, Mideast, and Rocky Mountain States. The Far West reported the least use. Close to 90 percent of the schools in the Mideast, Plains, and Southeast regions used NDEA monies for equipment purchases. Again the Far West indicated the least use, with about two-thirds of the schools receiving such assistance.

Whether a school has some type of laboratory facility or reported using rooms primarily equipped for nonscience teaching appeared to have made little difference in the use of NDEA funds for remodeling. As the following tabulation indicates, approximately one-third of the schools in each situation reported using the Federal funds:

Facility	*NDEA funds for remodeling*	
	Used	*Not used*
Total schools	**100.0**	**100.0**
Combination classroom-laboratory	31.3	68.7
Separate recitation room and laboratory	34.0	66.0
Some type of laboratory	31.6	68.5
No laboratory	24.2	75.9
Room primarily equipped for nonscience teaching	34.7	65.3

Of those schools which did not report the availability of laboratory facilities, about one-quarter used the remodeling funds. The data would thus indicate that many of the schools which most needed

Table H.—Percent of public junior high schools using National Defense Education Act funds for remodeling science facilities and purchasing science equipment, by school size and by geographic region: United States, 1963

School size and geographic region	Use of NDEA funds			
	Facilities remodeled	Equipment purchased	Facilities remodeled and equipment purchased	Neither facilities remodeled nor equipment purchased
School size				
All sizes	29.7	81.7	29.4	15.2
1–499	27.9	83.7	27.9	14.8
500–1,499	29.8	81.9	29.4	14.5
1,500 and over	34.7	71.8	34.7	22.4
Region				
New England	30.3	72.8	28.6	20.5
Mideast	32.8	89.7	32.3	8.6
Great Lakes	24.8	82.6	24.8	15.8
Plains	38.0	89.1	38.0	9.9
Southeast	34.5	87.3	34.5	9.4
Southwest	29.0	77.0	29.0	22.2
Rocky Mountains	32.6	73.7	32.6	18.6
Far West	14.1	66.0	13.8	26.4

to improve their instructional facilities for science were not taking advantage of the financial assistance provided under NDEA.

Availability of audiovisual aids.—In a comparison of readily available audiovisual aids in schools using NDEA funds for equipment with the availability of equipment in all schools, few major statistical differences were noted. As the following figures indicate, in most instances the percentages were slightly higher in schools using NDEA moneys:

Audiovisual aid	Schools using NDEA funds	Schools not using NDEA funds
Total schools	**100.0**	**100.0**
Commercial charts	62.1	60.8
Homemade charts	48.1	48.0
Commercial pamphlets	59.8	57.6
Micro-projector	73.6	69.6
Slide/filmstrip projector	94.5	93.9
Overhead projector	59.3	54.4
Opaque projector	68.9	67.1
Commercial models (ear, torso, etc.)	64.4	61.2
Sound motion pictures	80.2	80.4
Silent motion pictures	46.1	45.3
Television, broadcast receivers	28.2	27.8
Television, closed circuit	3.9	4.5
Filmstrips/slides	89.5	10.1
Flannelboard	24.4	23.9
Commercial displays	23.2	48.8

The greatest difference was in the greatly increased availability of filmstrips and slides. Overhead projectors, micro-projectors, and commercial models, however, appeared to have been increased to a greater extent with NDEA assistance than the other visual aids, except slides and filmstrips. The significance lies in the fact that most other equipment items were more readily available in the schools using these Federal moneys.

Financial Practices

Annual budget.—In almost three-fourths of the Nation's junior high schools the annual budget provided for new science equipment (table 26). There appeared to be a direct relationship between school size and the percent of schools which provided for such new equipment on an annual basis. While slightly over one-half of the smallest schools made such provision, almost nine-tenths of the largest schools and a somewhat smaller proportion in the middle-sized group budgeted annually for new science equipment. The practice was most prevalent in the Mideastern States, Southwest, Great Lakes, and Far West, where over 80 percent of the schools prepared annual equipment budgets (table 27). Such budgeting was least frequent in the Southeast, where less than 60 percent of the schools were so involved.

Annual budgeting for consumable materials also showed an increase as school size increased (table 26). A slightly larger percent of the schools budgeted for consumable materials (76 percent) than for equipment. The extent of practice varied geographically, ranging from a high of over 90 percent of the schools in the Mideast to less than 60 percent of the schools in the Southeast (table 27).

The larger the school, the more likely it was to budget for *both* new equipment and consumable materials (table 26). About 70 percent of all schools in the Nation budgeted for both. While about half of the small schools budgeted for both equipment and supplies, more than a third budgeted for neither, compared to about 5 percent of the large schools.

Estimated expenditures.—The amount of expenditures for science equipment and materials reflected school size. As table I indicates, a significant proportion of the small schools reported no expenditure of money for science instruction.

Table I.—Percent of public junior high schools by estimated expenditures[1] for science equipment and materials (other than books), and mean and median expenditures, by school size: United States, 1963

Estimated expenditures	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
Schools expending funds	73.4	66.7	75.6	78.7
Below $100	3.6	8.3	1.8	1.4
$100–199	7.0	6.9	7.4	4.2
200–399	18.6	19.9	18.2	17.0
400–599	16.0	16.3	15.8	16.3
600–799	6.3	5.8	6.1	10.7
800–999	5.3	4.4	5.5	7.1
1,000–1,999	9.5	5.1	11.1	12.2
2,000 or more	7.0	.0	9.6	9.8
None spent	4.9	10.6	2.7	2.9
Item nonresponse	21.7	22.7	21.7	18.4
Mean expenditure	$810.27	$418.54	$940.59	$946.41
Median expenditure	493.90	382.44	531.19	607.81

[1]Excluding National Defense Education Act funds.

NOTE.—Percents may not total 100.0 because of rounding.

Although the mean expenditure for science equipment and materials was slightly over $800, the median sum expended was considerably less ($494). However, throughout the Nation, the most frequent sum expended annually for science equipment and materials was within the range of

$200–399, although only a slightly smaller percent of the schools spent $400–599. This pattern of expenditures was consistent for all school size groups, indicating that large schools were *not* spending proportionately larger sums.

There was variation, however, in the geographic regions (table 28). In New England the most frequent science budget interval was $2,000 or more, giving this region the greatest percent of schools reaching this expenditure level. No school in New England reported expenditures below $100. The Rocky Mountains region indicated a diverse pattern, with $100–199 the most frequent expenditure range and $1,000–1,999 the second most frequent interval. The Southeast not only had the largest percent of schools of any region spending under $100, but also the lowest percent of schools in any region spending $1,000 and over.

Comparison with science expenditures in 1961.—More than three-fourths of the schools reported increased equipment purchases compared with expenditures 2 years earlier (table 26). Only the largest schools showed a pattern which was significantly different from the national average of all schools: Increased expenditures were significantly greater than 2 years previously, indicating proportionately greater increase in support for science instruction. However, considering school size, the per-pupil expenditures were not greater. The Plains States reported the greatest percent of schools increasing expenditures for science equipment, while the percent of increase was least in the Southeast and New England (table 27).

Laboratory fees.—Laboratory fees were charged by one-tenth of the schools in the country (table 26). Of the almost 90 percent of the schools that *did not* charge such a fee, 20 percent reported that they did not do so because the practice was prohibited. Laboratory fees were reported *not charged because of prohibition* more frequently as the school size group became larger. Regional difference in fee practices were apparent (table 27). More than one-quarter of the schools in the Southwest reported charging laboratory fees in contrast to no school in New England.

Teacher purchase of supplies.—Teacher purchase of supplies, a practice which encourages creativity and flexibility in science instruction, was permitted in less than one-quarter of the schools (table 26). A greater proportion of the smaller schools reported this practice than did schools in any other size group. On a regional basis, the smallest percentages of schools which permitted the practice were found in the New England and Plains States.

In view of the lack of budgeting for science in a number of schools, some very low budgets, total absence of expenditures in some schools, as well as extensive lack of flexibility in permitting teacher purchase of supplies, it would appear that financial practices relating to science instruction need to be reevaluated.

Chapter 6

Science Clubs and Science Fairs

WITH ABOUT ONE-HALF OF THE PUBLIC JUNIOR HIGH SCHOOLS of the country sponsoring science clubs, almost one-half sponsoring science fairs, and more than 60 percent taking part in science fairs sponsored by other schools, extra-instructional activities in science were more prevalent than many traditional classroom practices (tables 29, 30, 31).

Science Clubs

Distribution by school size and region.—The schools were about evenly divided in sponsoring science clubs, with nearly half of them providing such clubs (table 29). Club sponsorship was related to school size, with an increase in the percent of schools sponsoring clubs as the school size increased. About two-fifths of the small schools and three-fifths of the largest ones sponsored science clubs.

Science clubs were most frequent in the Mideast. The Far West had a considerably higher-than-average percent of schools sponsoring such clubs, while the Southwest and New England States reported the smallest proportion of clubs. The percent of schools which reported clubs in each region is listed below:

Region	*Percent*
All regions	49.4
New England	35.3
Mideast	63.1
Great Lakes	51.6
Plains	46.7
Southeast	49.6
Southwest	34.7
Rocky Mountains	37.8
Far West	57.4

Teacher sponsors.—The most frequent number of teacher-sponsors reported per school was one, with this number indicated by 40 percent of the schools (table 29). Slightly less than one-quarter of the schools reported two teacher-sponsors, while less than one-fifth reported three. The greatest percent of single club sponsors was in the smallest schools; however, a greater proportion of faculty members of small schools would appear to have been involved in science club sponsorship than in the large schools. As table J indicates, the total number of teacher-sponsors reported for all schools was about 2,900.

Pupil membership.—About 41,000 pupils, in all three grades, were reported as members of junior high school science clubs. The most frequent membership size reported was in the range of 26–50 students, although the range of 11–25 pupils was virtually as frequent (table 29). The mean number of pupil-members per school for the Nation was 26 (table J). Small schools reported the greatest proportion of any school size group having club memberships over 100 (table 29). Table J gives further evidence of the proportionally larger membership per school in the smaller schools: The mean

Table J.—Number of teacher-sponsors and pupil-members in public junior high school science clubs, by school size and geographic region: United States, 1963

School size and geographic region	Teacher-sponsors	Pupil-members		
		Total	Mean	Median
School size				
All sizes	2,912	40,825	26	29
1–499	633	14,894	41	29
500–1,499	1,986	21,973	21	28
1,500 and over	293	3,958	28	33
Geographic region				
New England	161	2,105	29	39
Mideast	710	6,443	18	25
Great Lakes	316	3,970	18	24
Plains	301	3,004	21	30
Southeast	634	13,137	39	25
Southwest	309	5,673	39	42
Rocky Mountains	125	1,342	22	35
Far West	356	5,151	24	33

number of pupil-members for these schools being about twice that of the middle-sized schools, and considerably more than the mean for schools with enrollments of 1,500 and over.

Student membership in science clubs was greatest in the Southeast with over 13,000 pupils reported, as table J indicates. The Mideast, Southwest, and Far West regions had the next largest science club participation, but with less than half the number indicated for the Southeast. The smallest membership was reported in the Rocky Mountain States. Science clubs in the Southeast and Southwest reported the largest mean number (39) of pupil-members.

Science Fairs

School involvement by school size and region.—Although about half of the schools reported sponsoring science fairs, only one-third involved all three grades. The frequency of involvement increased from seventh to ninth grade, as shown in table K.

Table K.—Percent of public junior high schools sponsoring science fairs, by grade level, by school size, and by geographic region: United States, 1963

School size and geographic region	Grade level				
	Any grade	All 3 grades	Grade 7	Grade 8	Grade 9
School size					
All sizes	48.9	33.0	35.8	41.1	46.6
1–499	32.5	24.1	25.5	26.7	31.1
500–1,499	54.9	36.5	39.7	46.0	52.2
1,500 and over	57.2	36.3	38.9	51.7	55.7
Region					
New England	75.0	45.8	50.8	56.1	71.6
Mideast	47.4	41.3	42.4	42.9	46.9
Great Lakes	37.3	16.1	19.3	24.2	34.9
Plains	38.2	23.7	26.7	33.0	38.2
Southeast	53.1	43.1	47.0	46.0	49.9
Southwest	42.4	22.4	24.0	32.1	39.9
Rocky Mountains	57.5	47.9	47.9	55.3	55.3
Far West	54.6	28.2	31.4	51.0	50.9

New England far exceeded the rest of the Nation in science fair sponsorship, with three-fourths of the junior high schools involved, although less than half of the schools had all three grades participating. The least participation was in the Great Lakes States, where less than two-fifths of the schools sponsored science fairs.

The extent of participation in science fairs with other schools was directly related to school size, ranging from under 45 percent of the small schools to over 70 percent of the large ones (table 30). The proportion of schools involving all three grades was even smaller than for school-sponsored fairs, with slightly more than one-quarter of the schools permitting all grades to take part in science fairs with other schools. In contrast, slightly less than one-half of the schools reported ninth grades participating in such an interschool endeavor.

The geographic pattern for participation in interschool science fairs, as listed below, was quite different from that of school-sponsored science fairs. Seventy-three percent of the schools in the Rocky Mountains reported participation in interschool fairs, in contrast to 58 percent which sponsored science fairs.

Region	*Percent*
Total schools	**100.0**
All regions	60.5
New England	52.8
Mideast	65.0
Great Lakes	61.1
Plains	60.1
Southeast	61.0
Southwest	50.0
Rocky Mountains	72.7
Far West	63.3

Pupil participation.—More than 54,500 pupils participated in science fairs during the reporting year. This figure constituted about 2 percent of the students enrolled in public junior high schools. The grade level breakdown of fair participants is shown below:

Grade	*Number*	*Percent*
Total pupils, all schools	**2,432,285**	**100.0**
All grades	54,509	2.2
Grade 7	11,936	.5
Grade 8	16,801	.7
Grade 9	25,772	1.1

Projects.—A total of more than 268,000 science fair projects was noted for the reporting year (table 31). In the small and middle-sized schools the largest percent of projects was at the ninth-grade level, reflecting the proportion of students participating. In schools of 1,500 and over, however, the degree of eighth-grade involvement was virtually the same as the ninth. The mean number of projects for all grades was 175, ranging from 60 in the seventh grade to 77 in the ninth.

Chapter 7

Improving Science Instruction

Inservice Teacher Education

Local inservice training.—Two-thirds of the Nation's public junior high schools provided some type of inservice training for science teachers at the system or school level. As table L shows, the availability of such training was associated with school size, with a progressive increase in all types of training as the school size increased. Somewhat more than one-half of the small schools reported providing school or system training, while about nine-tenths of the large ones indicated its availability. Training was provided entirely by the school system more than four times as frequently as by the individual school, although the more common pattern was for provision of training at both school and system levels.

The size of the school apparently had little association with provision of training by the school only. However, more of the schools with enrollments over 1,500 reported training opportunities at the system level only than did smaller schools.

The availability of inservice science training in school or system programs varied considerably with geographic region, ranging from about one-quarter of the schools in New England to more than three-quarters of the schools in the Far West (table 32).

Size of school had little relationship to the availability of funds for teacher participation in inservice training programs sponsored by agencies other than the schools (table L). About two-fifths of the schools had financial assistance for such programs. Regional practices varied with about one-half of the Great Lakes schools providing such moneys, in contrast to one-quarter of the schools in the Rocky Mountains. Regardless of school size, the most frequent source of funds reported for such inservice training in science was the local board of education. State funds were second in usage. Only in the Great Lakes region did the percent of schools using private funds exceed that using State moneys. In the Southeast, local board of education and State funds were used with about equal frequency.

Table L.—Percent of public junior high schools participating in inservice education programs for science teachers, by type of program, source of funds, and school size: United States, 1963

Type of program and source of funds	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
School or system sponsored programs	65.8	58.4	66.3	89.0
Both school and system	33.9	31.0	34.4	39.3
System only	25.8	22.3	25.2	43.6
School only	6.2	5.0	6.7	6.0
None	31.9	41.6	30.4	9.0
Summer curriculum development	26.0	11.4	29.4	51.1
National Science Foundation institutes	66.3	51.2	71.4	77.3
Other programs, source of funds:				
Any source	40.6	32.8	43.2	45.9
Local board of education	25.3	17.5	28.0	30.4
State department of education	9.1	12.8	7.7	7.3
Private	5.5	3.7	6.3	5.0
Other	9.0	3.5	10.4	16.2

Summer curriculum development.—About one-quarter of the Nation's schools provided funds for curriculum development programs in science during the summer months (table L). Although one of the basic purposes of such programs is to develop courses of study and instructional materials for local use, participating teachers have found them to be vital inservice training opportunities. The extent of involvement in such curriculum develop-

ment programs was related to school size, with a progressive increase as school size increased. Slightly more than one-tenth of the smallest schools provided funds for such summer activities, while more than one-half of the large ones did. Schools in the Far West far exceeded the rest of the Nation in the incidence of budgeting for summer curriculum development work, with more than 40 percent of the schools so involved, in contrast to about 17 percent of those in New England (table 32).

National Science Foundation institutes.—The spread of National Science Foundation institute training in science was computed in two ways: (1) the percent of schools that had at least one science teacher with NSF institute experience, and (2) the percent of all science teachers that had received this type of training (table M). Two-thirds of the schools reported that at least one of their teachers currently teaching science had participated in a National Science Foundation institute. As schools increased in size, proportionately more reported teachers who had been involved in NSF programs. The greatest representation of participating schools appeared to have been in the Rocky Mountain States. The least representation was in New England and the Southeast, each reporting that about half of the schools had participating teachers.

The data indicated that about 28 percent of the public junior high school teachers teaching science during the reporting year had participated in an NSF institute.

In terms of percent of science teachers who had participated in NSF institutes, the Plains States ranked first, followed by the Rocky Mountains and Mideast States. The smallest percents of participating science teachers were reported in New England and the Southeast.

The greatest percent of teacher participation was in the middle-sized schools, with teachers in small schools a close second.

Participation in N.S.F. institutes is summarized in table M.

Table M.—Percent of public junior high school teachers with National Science Foundation science institute experience, and percent of schools with at least one such teacher on faculty, by school size and geographic region: United States, 1963

School size and geographic region	Teachers	Schools
School size		
All sizes	27.7	66.3
1–499	26.0	51.2
500–1,499	28.8	71.4
1,500 and over	23.8	77.3
Geographic region		
New England	22.6	50.3
Mideast	30.0	78.7
Great Lakes	27.3	70.1
Plains	41.9	79.2
Southeast	22.9	50.6
Southwest	25.5	66.5
Rocky Mountains	30.1	81.4
Far West	25.9	63.2

Consultant[1] Assistance

Nearly 80 percent of the schools of the Nation provided some type of specialist help for science teachers (table 33). The availability of consultants was closely related to school size, for there was a progressive increase in the percent of schools using consultant help as school size increased, ranging from 65 percent of the small schools to 93 percent of the largest ones.

Sources of specialists.—About one-half of the schools used curriculum or science specialists from city or county school departments; nearly 40 percent availed themselves of the services of State department of education staff members; and local professional people and college or university personnel followed in order of use.

While the percent of schools using city-county specialists increased with the increase in school size, this was not true in relation to the use of State personnel. The medium-sized schools used State science specialists most frequently, and the large schools used them least often (only 25 percent).

The pattern of use of college and university staff members was similar to that of State science specialists. Although large schools often are found in large metropolitan areas where many institutions of higher education are located, only about one-tenth of the large schools availed themselves of this source of assistance, in contrast to almost one-third of the medium-sized schools and over one-quarter of the small schools.

Helping teachers serving several schools were reported in 10 to 12 percent of the small and middle-sized schools, in contrast to over one-third of the large schools. Thus, this form of teacher assistance was mainly associated with the largest schools.

Regional patterns.—The regional picture also showed wide variation in the use of consultants

[1]The terms *consultant* and *specialist* are used synonymously.

(table 34). Close to 90 percent of the schools in the Far West made available some type of consultant help, in contrast to about 60 percent of the New England schools. Only in the Plains States were city-county consultants *not* the most frequent source of help. In that region, State department of education personnel were used most frequently, serving more than one-half the schools. The Southeast was the only other region in which State consultants were used in more than one-half of the schools; however, there the use of city or county school personnel was still greater than that of State personnel.

Well over one-third of the schools in the Southwest used consultants from institutions of higher education, in comparison to less than one-half that fraction in the Mideast.

Helping teachers serving several schools were reported by over one-fifth of the schools in the Far West, and by about one-twentieth or less of the schools in New England, the Plains, and Rocky Mountains regions.

Types of consultants.—General curriculum specialists to assist with the science program were available to less than half of the schools, most frequently from city-county school departments (table 33). State department of education staff and college faculty members followed in frequency. Helping teachers serving several schools were used in about as many schools as were local professional people.

Science specialists were available to teachers in more schools than were general curriculum specialists, with about 58 percent of the schools reporting their use. Local and State government science personnel were more frequently used by the schools. However, four times as many schools used local professional people as science consultants than as general curriculum consultants.

In the Plains and Southeast regions, State consultants were reported most frequently, with use of college-university staff members less frequent than city or county science specialists (table 34). Three of the regions reported using local professional personnel (science trained) about as often or more often than State department of education specialists. Seventy-five percent of the schools in the Far West States reported the availability of science-trained specialist personnel in contrast to 42 percent of the New England schools.

Chapter 8

Summary and Implications

Summary of Selected Findings

GREAT VARIETIES OF PRACTICES AND PROCEDURES were found among schools of varying sizes and in different regions of the country. The nature of the science instruction was considerably affected by many factors, including instructional resources, school organization, curriculum, and economic resources. Teacher skills, reflecting training, imagination, and initiative also affected science instruction, although their impact was only indirectly indicated through the use of teacher-prepared materials.

Enrollment and organization.—Although all junior high schools offered science courses at some grade level, not all offered them at each grade level. There was a progressive increase in the number of schools offering science instruction as the grade level increased. General Science was the most common science course, offered by about 95 percent of the schools. Life Science-Biology was available in about one-quarter of the schools, and other courses in one-tenth or less. The greatest diversity of course offerings was found in middle-sized schools, *not* the largest one. Although more than three-fourths of all public junior high school students were enrolled in science courses, the smallest proportion was found in the large schools. On a regional basis, the Far West had the smallest proportion of enrollment (about 50 percent), while New England had the largest (95 percent of the students).

The mean class size for all junior high school science courses in the Nation was 29. The Southwest had the smallest science classes, while the Far West had the largest; however, this pattern was not consistent for all courses in each region. Regional means of 41–42 students were reported for certain courses.

In schools which offered General Science, nearly 80 percent granted graduation credit for the course at some grade level. For Physical Science and Life Science-Biology the percent was a little smaller. Graduation credit for science courses below the ninth grade was offered infrequently.

Homogeneous grouping for science instruction was reported by about 60 percent of the schools, although only 67 percent of those which grouped used it in all three grades. The frequency of such grouping was related to school size: most often in the larger schools. The trend appeared to be toward increasing the extent of grouping for science instruction. Multiple factors were utilized as bases for such grouping, the most frequent being teacher recommendation and intelligence tests.

Teachers with science assignments constituted 13 percent of the total public junior high school instructional staff. The largest schools had proportionately fewer science teachers than the national average. Relatively few of the teachers had full-time science assignments; about one-third spent 10 hours or less per week in science classrooms. Regional differences were quite evident. In the Southeast the most frequent science teaching assignment was 1–5 periods per week.

Instructional resources.—Virtually all schools used science textbooks, but only 80 percent used them at all three grade levels. They were used least frequently in the seventh grade. Some small schools reported they did not use any. Use of a single textbook, as opposed to multiple ones, was the prevailing practice, and was most frequent for the oldest students, ninth graders. About half of the schools reported using a coordinated textbook series for all three grades.

Science textbooks were distributed by loan only to students in more than three-fourths of the schools. About one-eighth of the small schools

and one-quarter of the schools in the Southeast reported that their pupils in at least one grade could obtain science textbooks only by buying them.

The most frequent appearance of relatively recent textbooks was reported for Earth Science. The oldest textbooks were reported for General Science, but more schools reported using books published prior to 1953 for Life Science-Biology at the time data were collected. About 60 percent of the schools reported having some science textbooks 2–4 years old at the time of the study. Some indicated use of books 14 or more years old.

All supplementary materials showed progressive increase in use with increase in grade level. Locally prepared student worksheets were reported used most frequently, while teacher-developed resource material used in place of textbooks was used least. Considerably more small schools used workbooks, and somewhat more used locally prepared resource material, compared to the larger schools.

Libraries were reported by 94 percent of the schools. Although 85 percent rated their general reference collections as *good* and *excellent*, considerably fewer gave the same rating to the science reference collections. Even fewer so rated their collections of science books. In order of descending frequency of *excellent* or *good* ratings of school collections were the following types of periodicals: popular science magazines, weekly science magazines, scientific journals, and professional science teaching periodicals. Although reported used by more than two-thirds of the schools, only 7 percent of them rated their science paperback book collection as *excellent*.

Over 90 percent of the schools provided reference materials and science books in addition to adopted texts. However, only one-fifth reported as *excellent* the availability of some reference material from outside the classroom.

Certain common audiovisual aids were not reported in a surprisingly large number of schools. Even in schools where the aids were present, they were not always readily available for science instruction.

Combination classroom-laboratories were the most common facility, although more than one-quarter of the schools did not provide any type of laboratory. Availability of laboratory facilities was more closely related to a particular science course than to grade level. About 40 percent of the largest schools used nonscience rooms for science instruction.

Most schools provided water, gas, and electricity for teacher demonstration, although a lesser percent of the smaller schools had them available. Only about one-quarter of the schools had all three utilities available at pupil laboratory tables.

Science storage space was lacking in a number of schools. Special science facilities and equipment were most often found in the larger schools.

Funds for science.—Over 80 percent of the schools used National Defense Education Act funds to purchase science equipment. Approximately one-third used NDEA funds for remodeling.

The proportion of schools budgeting for consumable materials was slightly larger than the proportion budgeting for science equipment, with about seven-tenths budgeting for both.

Some schools, including over one-tenth of the small ones, reported no expenditure of money for science equipment and materials. Although the mean expenditure per school for the Nation was about $800, the median sum was $494.

Teacher purchase of supplies was permitted in less than one-quarter of the schools.

Science clubs and science fairs.—Science clubs and science fairs were sponsored by about half of the Nation's public junior high schools. Greater club activity was reported in small schools than in large ones.

Only one-third of the schools sponsoring science fairs reported involving all three grades. Participation increased with grade level and with size of school. About 2 percent of the total pupils participated in the fairs.

Inservice teacher education.—Two-thirds of the public junior high schools had available some type of inservice training for science teachers. Such training was most frequently available in the larger schools. The most common sources of funds were local school boards and State departments of education.

Teachers from two-thirds of the schools, constituting slightly more than one-quarter of all the science teachers, had been in National Science Foundation institutes. The smallest percent of participation was reported for teachers in the largest schools.

Consultant assistance.—Consultants were more often available to the larger than to the smaller schools, although they were available in about four-fifths of the total schools. Such assistance was most extensive in the Far West. City or county school departments most often provided consultants, followed by State departments of education. Science specialists were available more often to

science teachers than were general curriculum specialists. Helping teachers serving several schools were found most frequently in the larger schools, but these same schools made the least use of college faculty members.

Implications

Areas of inadequacy which are apparent in the national picture of science teaching in the public junior high schools can be improved only when individual schools and districts examine their own situations in terms of potential improvement. Recognition of inadequacies brought to light by the study may assist local school units in improving practices related to science instruction.

- The overwhelming proportion of junior high school science teachers assigned to part-time science instruction suggests the need to recruit teachers specifically trained in science for full-time science teaching. Improvement in such instruction will be slow as long as most science teachers are assigned only part-time in their discipline, and hence they cannot focus interest and energy upon a demanding instructional area which includes laboratory activities with all the related equipment and supply details.

- The fact that specific science courses other than general science (which is taught in 96 percent of the schools) are offered in one-fourth or fewer of the schools suggests that the junior high school level is perpetuating the broad, generalized science instruction characteristic of the elementary grades. Perhaps greater attention needs to be given to foundation courses such as physical science, life science, or earth science to synthesize the elementary school experience and lay a foundation for more specialized work at the high school level, as well as provide a focus for the majority of students who often take only one additional science course prior to high school graduation.

- Although laboratory work is basic to the nature of science and should be considered essential to its instruction, evidence seems to indicate that this is not the case, since (1) only three-fourths of the schools provide any type of laboratory facility, (2) over 40 percent of the largest schools report using rooms primarily equipped for nonscience teaching, (3) only slightly more than one-quarter of the schools provide water and gas at pupil laboratory tables, and (4) almost one-fifth provide for neither new equipment nor consumable materials in the annual budget. Class size—particularly in some courses, many large schools, and certain geographic regions—is so large as to discourage meaningful student laboratory activities, or to make adequate supervision of them impossible. Thus, increased consideration needs to be given to those factors contributing to significant student laboratory activities if they are to become an integral part of science instruction.

- The vast diversity in annual expenditures for science equipment and materials for schools of the country, particularly where the largest regional median figure is more than 2½ times that of the lowest region, indicates wide disparity of science support. With 5 percent of the total schools reporting *no* expenditures for science instruction, and less than 50 percent of the schools in one region budgeting for both science equipment and supplies, financial practices and support might well warrant examination.

- The fact that less than one-quarter of the Nation's science teachers were permitted to purchase directly any supplies would appear to indicate a lack of flexibility in purchasing practices. Teacher creativity might be encouraged if an instructor could make some supply purchases during the school year.

- With a substantial proportion of the schools giving themselves a *fair* or *poor* rating on specific types of science reference materials, as well as rating the total science reference collection lower than the general reference one, there is need for greater attention to these resources. Since libraries are not provided in all schools, nor are reference materials from outside the classroom readily available in four-fifths of the schools, not only resources but also library practices deserve attention.

- With some schools using textbooks 14 or more years old, the recency factor, so critical in this age of accelerating new developments in the field of science, deserves scrutiny.

- Since the older students were reported as the most frequent users of a single textbook (as opposed to multiple textbooks), consideration

might be given to increasing the amount of written materials from many sources, including other textbooks, especially for these older students.

- Materials for use with audiovisual equipment are not always available. Although more than 90 percent of the schools have slide/filmstrip projectors, only 10 percent also have slides and filmstrips readily available. Thus it seems that an analysis of the available visual materials in relation to equipment available is in order.
- Inasmuch as only one-third of the schools sponsoring science fairs reported involving all three grades, consideration should be given to making such participation available to all students who are interested.
- The smallest schools, ones in which the services of a science specialist or consultant might be particularly useful, are the ones in which they are least obtainable. Since less than 60 percent of the Nation's schools have available the services of such personnel from any source, ways of making this assistance more readily available should be explored.

Appendix A

Basic Tables

Table 1.—Number and percent of public junior high schools, by size and by geographic region: United States, 1963

Geographic region	School size									
	All sizes		1–499		500–999		1,000–1,499		1,500 and over	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All regions	**3,133**	**100.0**	**848**	**100.0**	**1,468**	**100.0**	**587**	**100.0**	**230**	**100.0**
New England	203	6.5	11	1.3	169	11.5	24	4.0	0	.0
Mideast	554	17.7	113	13.3	237	16.1	124	21.1	80	34.9
Great Lakes	422	13.5	49	5.8	262	17.9	96	16.3	15	6.6
Plains	310	9.9	105	12.4	157	10.7	42	7.2	5	2.3
Southeast	680	21.7	348	41.1	195	13.3	104	17.6	33	14.3
Southwest	421	13.4	171	20.1	187	12.7	47	8.1	16	7.1
Rocky Mountains	162	5.2	37	4.4	89	6.1	24	4.1	12	5.2
Far West	381	12.2	15	1.7	172	11.7	126	21.5	68	29.6

NOTE.—Due to rounding, percents may not total 100.0.

Table 2.—Number and percent of classroom teachers (full time and part time) in public junior high schools, by geographic region and by school size: United States, 1963

Geographic region	School size									
	All sizes		1–499		500–999		1,000–1,499		1,500 and over	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All regions	**110,885**	**100.0**	**11,519**	**100.0**	**50,38[illegible]**	**100.0**	**31,197**	**100.0**	**17,780**	**100.0**
New England	6,999	[illegible]3	149	1.3	5,58[illegible]	11.1	1,264	4.1	0	.0
Mideast	25,401	22.9	2,055	17.8	8,939	17.7	7,756	24.9	[illegible],651	37.4
Great Lakes	16,610	15.0	1,126	9.8	9,126	18.1	5,226	16.8	1,132	6.4
Plains	10,598	9.6	2,195	19.1	5,670	11.3	2,318	7.4	415	2.3
Southeast	16,262	14.7	3,088	26.8	6,219	[illegible]2.3	4,746	15.2	2,209	12.4
Southwest	11,551	10.4	2,041	17.7	6,088	12.1	2,241	7.2	1,180	6.6
Rocky Mountains	6,079	5.5	645	5.6	3,151	6.3	1,238	4.0	1,045	5.9
Far West	17,386	15.7	221	1.9	5,612	11.1	6,406	20.5	5,147	28.9

NOTE.—Due to rounding, percents may not total 100.0.

Table 3.—Number and percent of students in public junior high schools, by geographic region and by school size: United States, 1963

Geographic region	School size									
	All sizes		1–499		500–999		1,000–1,499		1,500 and over	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All regions	**2,432,285**	**100.0**	**214,062**	**100.0**	**1,089,975**	**100.0**	**707,913**	**100.0**	**420,334**	**100.0**
New England	141,420	5.8	2,550	1.2	112,143	10.3	26,727	3.8	0	.0
Mideast	509,642	21.0	36,427	17.0	176,048	16.2	153,147	21.6	144,020	34.3
Great Lakes	358,254	14.7	18,758	8.8	193,831	17.8	118,004	16.7	27,661	6.6
Plains	217,719	9.0	36,752	17.2	120,655	11.1	50,519	7.1	9,793	2.3
Southeast	398,195	16.4	69,669	32.5	149,580	13.7	120,901	17.1	58,046	13.8
Southwest	264,016	10.9	34,520	16.1	140,575	12.9	58,228	8.2	30,694	7.3
Rocky Mountains	132,304	5.4	10,838	5.1	70,251	6.4	29,126	4.1	22,090	5.3
Far West	410,734	16.9	4,548	2.1	126,892	11.6	151,263	21.4	128,031	30.5

NOTE.—Nongraded students are omitted in the regional breakdown. Due to rounding, percents may not total 100.0.

Table 4.—Percent of public junior high schools by number of regularly scheduled class periods per day and by school size: United States, 1963

Number of periods	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
4	.9	2.8	.2	.0
5	6.9	13.8	4.1	4.6
6	47.9	43.0	50.8	40.8
7	29.8	25.2	31.1	35.2
8	8.2	7.6	7.8	14.3
9 or more	3.2	1.8	3.8	2.9
Nonresponse	3.2	5.8	2.2	2.3

NOTE.—Due to rounding, percents may not total 100.0.

Table 5.—Percent of public junior high schools by length of class periods and by school size: United States, 1963

Number of minutes	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
37 or fewer	1.1	1.4	1.0	.5
38–42	9.8	7.6	10.0	15.8
43–47	20.7	16.9	22.4	19.8
48–52	25.9	22.8	26.1	36.6
53–57	35.0	40.9	33.8	23.4
58–62	5.3	6.2	5.2	2.0
63 or more	.4	1.4	.0	.0
Nonresponse	1.9	2.9	1.5	1.9

NOTE.—Due to rounding, percents may not total 100.0.

Table 6.—Percent of public junior high schools by length of school year and by school size: United States, 1963

Number of days	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	100.0	100.0	100.0	100.0
164 or less	0	.0	.0	.0
165–175	10.0	20.1	6.5	3.6
176–185	79.8	74.0	83.0	74.0
186–195	8.3	4.0	8.9	18.7
196 or more	1.1	.4	1.2	3.7
Nonresponse	.7	1.4	.5	.0

NOTE.—Due to rounding, percents may not total 100.0.

Table 7.—Percent of public junior high schools offering selected science courses, by grade level and by school size: United States, 1963

Grade and course	School size				
	All sizes	1–499	500–999	1,000–1,499	1,500 and over
Total schools	100.0	100.0	100.0	100.0	100.0
ALL GRADES					
Any science course	100.0	100.0	100.0	100.0	100.0
General Science	94.1	94.9	91.8	97.1	97.8
Life Science-Biology	24.4	9.1	32.0	31.0	17.4
Physical Science	10.2	6.6	13.3	7.6	10.8
Earth Science	11.2	2.7	15.6	11.8	13.7
Space Science	.2	.0	.4	.2	.0
Earth-Space Science	1.0	.0	1.3	2.2	.5
Health Science	2.1	1.8	2.1	2.4	2.6
GRADE 7					
Any science course	86.4	95.9	88.3	75.3	67.4
General Science	78.2	87.8	77.1	72.4	64.2
Life Science-Biology	5.2	4.9	7.4	1.6	1.3
Physical Science	.2	.0	.5	.0	.0
Earth Science	1.4	.0	2.5	.7	1.9
Space Science	.1	.0	.2	.0	.0
Earth-Space Science	.0	.0	.0	.0	.0
Health Science	1.0	1.8	.9	.0	.5
GRADE 8					
Any science course	97.7	98.6	96.4	98.9	98.9
General Science	87.0	91.7	82.2	90.0	92.8
Life Science-Biology	2.1	.0	3.8	1.3	1.4
Physical Science	1.5	2.9	1.3	.5	.0
Earth Science	3.8	1.2	6.4	1.8	2.2
Space Science	.2	.0	.4	.0	.0
Earth-Space Science	.5	.0	.7	1.1	.0
Health Science	1.7	1.4	1.4	2.4	2.6
GRADE 9					
Any science course	97.9	97.2	99.6	95.6	95.9
General Science	86.2	91.7	84.0	83.3	86.8
Life Science-Biology	18.0	4.3	22.4	28.6	14.6
Physical Science	9.1	5.1	11.8	7.6	10.8
Earth Science	6.0	1.5	6.7	9.3	10.1
Space Science	.2	.0	.4	.2	.0
Earth-Space Science	.6	.0	.6	1.6	.5
Health Science	.1	.0	.2	.0	.0

NOTE.—Because of duplicated count (multiple courses), percents will not total 100.0.

Table 8.—Number and percent of public junior high school pupils enrolled in certain science courses, by school size: United States, 1963

Course	School size									
	All sizes		1–499		500–999		1,000–1,499		1,500 and over	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total school enrollment	**2,432,285**	**100.0**	**223,071**	**100.0**	**1,085,115**	**100.0**	**703,766**	**100.0**	**420,334**	**100.0**
Total science enrollment	**1,877,894**	**77.2**	**200,742**	**90.0**	**889,055**	**81.9**	**492,571**	**70.0**	**295,526**	**70.3**
General Science	1,627,555	66.9	180,496	80.9	732,620	67.5	443,355	63.0	271,084	64.5
Life Science-Biology	86,918	3.6	6,004	2.7	55,582	5.1	19,134	2.7	6,198	1.5
Physical Science	56,857	2.3	6,171	2.8	35,306	3.3	9,587	1.4	5,794	1.4
Earth Science	48,884	2.0	2,364	1.1	33,680	3.1	6,782	1.0	6,058	1.4
Earth-Space Science	6,337	.3	0	.0	3,999	.4	1,791	.3	548	.1
Health Science	22,682	.9	4,538	2.0	9,809	.9	4,772	.7	3,563	.8

NOTE.—Course enrollments reported exclude approximately 4,700 students in ungraded classes.

Table 9.—Percent of classroom teachers who teach science in public junior high schools by number of periods of science taught per week per teacher, and by geographic region: United States, 1963

Number of periods	Geographic region								
	All regions	New England	Mideast	Great Lakes	Plains	Southeast	Southwest	Rocky Mountains	Far West
Total science teachers	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
1–5	18.7	9.6	13.3	16.3	16.9	28.9	22.9	14.3	17.7
6–10	12.7	13.2	7.5	17.3	8.9	16.3	13.9	10.6	12.3
11–15	9.6	8.2	7.6	11.9	9.6	9.7	7.8	8.4	13.4
16–20	10.3	15.5	11.0	8.6	9.7	9.0	10.9	8.1	11.3
21–25	36.0	39.6	48.4	31.9	51.3	26.1	31.5	28.9	30.7
26–30	9.9	10.7	9.8	11.7	2.8	6.3	9.3	27.8	10.8
31–35	1.8	1.9	.5	1.7	.6	2.7	2.9	1.8	2.4
36–40	1.1	1.5	1.9	.5	.0	1.4	.9	.0	1.4
Nonresponse	.1	.0	.0	.0	.0	.4	.0	.0	.0

NOTE.—Percents may not total 100.0 because of rounding.

Table 10.—Mean size of science classes, by course, by grade level, and by school size: United States, 1963

Course and grade level	School size				
	All sizes	1–499	500–999	1,000–1,499	1,500 and over
All science courses	**29.3**	**22.7**	**29.4**	**30.9**	**32.2**
Grade 7	29.8	24.1	29.7	31.7	32.7
Grade 8	29.7	23.5	29.5	31.3	32.3
Grade 9	28.4	20.6	29.1	29.7	31.4
General Science	**29.4**	**22.3**	**29.7**	**31.1**	**32.3**
Grade 7	29.9	23.6	29.9	31.7	32.7
Grade 8	29.8	23.3	29.7	31.4	32.3
Grade 9	28.5	20.2	29.6	30.1	31.8
Life Science-Biology	**27.8**	**26.5**	**27.5**	**28.0**	**31.3**
Grade 7	28.5	27.8	28.4	31.2	32.7
Grade 8	28.2	.0	27.7	27.1	32.0
Grade 9	27.1	21.8	26.5	27.7	31.9
Physical Science	**28.1**	**26.3**	**27.9**	**28.9**	**30.0**
Grade 7	25.3	.0	25.3	.0	.0
Grade 8	28.6	26.3	30.3	12.0	.0
Grade 9	28.1	26.4	27.7	29.0	30.0
Earth Science	**29.0**	**25.6**	**28.6**	**29.8**	**32.0**
Grade 7	28.4	.0	26.5	29.8	33.4
Grade 8	29.6	25.8	29.0	33.3	33.2
Grade 9	28.2	25.3	29.0	27.9	26.3
Space Science	**23.1**	**.0**	**17.6**	**33.1**	**.0**
Grade 7	16.5	.0	26.5	.0	.0
Grade 8	17.7	.0	17.7	.0	.0
Grade 9	27.1	.0	18.3	33.1	.0
Earth-Space Science	**33.0**	**.0**	**29.4**	**43.5**	**36.2**
Grade 7	.0	.0	.0	.0	.0
Grade 8	33.7	.0	28.9	58.4	.0
Grade 9	31.9	.0	30.7	31.1	36.2
Health Science	**30.4**	**29.7**	**30.1**	**30.0**	**32.4**
Grade 7	30.8	33.1	29.1	.0	31.1
Grade 8	30.5	26.2	31.7	30.0	32.6
Grade 9	25.9	.0	25.9	.0	.0

Table 11.—Mean size of science classes, by course and by geographic region: United States, 1963

Course	Geographic region								
	All regions	New England	Mideast	Great Lakes	Plains	Southeast	Southwest	Rocky Mountains	Far West
All science courses	**29.3**	**29.2**	**30.1**	**29.8**	**28.6**	**30.5**	**24.2**	**30.2**	**30.9**
General Science	29.4	29.8	30.1	30.1	28.7	30.5	22.0	31.1	31.1
Life Science-Biology	27.8	23.7	27.1	27.5	27.9	30.4	28.6	29.0	26.8
Physical Science	28.1	.0	30.1	28.1	28.4	32.1	28.1	24.5	27.6
Earth Science	29.0	24.4	29.2	28.9	27.6	34.9	30.9	25.4	27.7
Space Science	23.1	.0	33.1	.0	.0	.0	.0	.0	17.6
Earth-Space Science	33.0	.0	41.8	.0	28.9	26.3	.0	.0	30.0
Health Science	30.4	28.5	30.8	28.9	27.2	29.9	32.0	.0	41.1

Table 12.—Percent of public junior high schools giving high school graduation credit for science courses, by course and by grade level: United States, 1963

Grade level and graduation credit for schools offering course	Course						
	General Science	Life Science-Biology	Physical Science	Earth Science	Space Science	Earth-Space Science	Health Science
All grades	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Credit given	78.0	67.6	70.3	60.7	42.8	29.0	15.1
Credit not given	11.4	10.2	14.9	15.5	57.2	32.4	40.2
Nonresponse	10.6	22.2	14.8	23.8	.0	38.5	44.8
Grade 7	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Credit given	5.2	2.2	53.0	26.2	.0	.0	.0
Credit not given	83.1	34.8	.0	9.8	100.0	.0	52.1
Nonresponse	9.8	33.8	47.8	56.1	.0	.0	36.7
Grade 8	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Credit Given	7.6	23.1	7.4	.0	.0	.0	.0
Credit not given	80.3	10.1	73.6	18.2	100.0	80.4	50.5
Nonresponse	10.8	53.4	20.0	46.3	.0	.0	37.1
Grade 9	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Credit given	84.9	89.8	79.1	100.0	42.8	47.3	100.0
Credit not given	9.3	5.1	9.9	15.5	57.2	5.4	.0
Nonresponse	8.2	14.1	13.3	1.7	.0	62.8	.0

NOTE.—Because of rounding, percents may not total 100.0.

Table 13.—Percent of public junior high schools by use of science textbooks, by grade and by school size: United States, 1963

Use and grade level	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
Science textbooks				
Any grade	98.6	98.6	98.5	100.0
All three grades	80.3	88.9	78.6	63.3
Grade 7—total[1]	84.5	94.5	82.2	68.0
Grade 8—total[1]	95.4	95.9	94.8	98.9
Grade 9—total[1]	95.6	94.4	96.1	95.9
None and nonresponse[2]	1.4	1.4	1.5	.0
Grade 7 only	.0	.0	.0	.0
Grade 8 only	.9	.0	1.3	.0
Grade 9 only	1.2	1.4	1.2	.5
Single textbook				
Any grade	81.0	84.1	81.1	69.0
All three grades	59.3	74.4	54.7	43.0
Grade 7—total[1]	67.0	80.0	63.9	46.3
Grade 8—total[1]	73.0	81.3	71.2	57.6
Grade 9—total[1]	73.8	79.9	72.0	67.6
None and nonresponse[2]	19.0	15.9	18.9	31.0
Coordinated series				
At least two grades	53.8	67.0	49.1	46.1
All three grades	49.9	67.0	44.8	30.3
Grades 7+8	.6	.0	.5	2.9
Grades 7+9	.7	.0	1.0	.0
Grades 8+9	2.7	.0	2.7	12.9
None and nonresponse[2]	46.2	32.9	50.9	53.9

[1]Textbook used in this grade only and in any combinations of grade 7, 8, and 9.
[2]Because of the small incidence of nonresponse, this figure was combined with "None" in the data processing.

Table 14.—Percent of public junior high schools by practices of textbook distribution, by grade and by school size: United States, 1963

Distribution practice and grade	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
Loan only (in any grade)	76.7	66.6	78.8	97.0
Grade 7	66.8	64.9	67.8	65.5
Grade 8	76.6	65.2	79.2	96.5
Grade 9	69.3	53.4	73.8	88.4
All three grades	55.8	47.5	59.3	55.8
Loan in combination with other distribution practices[1]	1.2	3.0	.7	.0
Rent only (in any grade)	10.9	12.9	11.2	1.0
Grade 7	9.8	11.8	9.9	1.0
Grade 8	10.8	12.9	11.0	1.0
Grade 9	13.2	12.8	14.4	4.6
All three grades	8.6	9.0	9.4	1.0
Rent in combination with other distribution practices[1]	.6	1.1	.5	.0
Purchase only[1]	5.6	13.3	3.0	.0
Purchase in combination with other distribution practices[1]	.7	1.8	.3	.0

[1]Grade breakdown omitted because percentage was essentially the same for all grades.

Table 15.—Percent of public junior high schools by selected practices of textbook distribution, by geographic region: United States, 1963

Region	Distribution practice			
	All schools	Loan only	Rent only	Purchase only
All regions	[1]100.0	76.7	10.9	5.6
New England	100.0	80.9	0.0	0.0
Mideast	100.0	96.9	2.9	0.0
Great Lakes	100.0	59.5	31.4	0.0
Plains	100.0	65.3	28.1	1.4
Southeast	100.0	60.0	7.6	25.3
Southwest	100.0	92.2	.8	0.0
Rocky Mountains	100.0	66.1	29.5	0.0
Far West	100.0	90.9	.8	0.0

[1]Combinations of practices not included, hence totals will not equal 100.0.

Table 16.—Percent of public junior high schools by most recent copyright date of science textbooks used, by course and by school size: United States, 1963

Course and most recent textbook copyright date	School size			
	All sizes	1–499	500–1,499	1,500 and over
General Science—total schools	**100.0**	**100.0**	**100.0**	**100.0**
1962 or later	12.6	7.7	14.3	15.6
1959–61	55.3	52.2	55.6	64.4
1956–58	19.0	19.3	19.6	12.9
1953–55	1.5	1.9	1.3	1.4
1950–52	.4	.0	.7	.0
Before 1950	.4	1.5	.0	.0
None and nonresponse[1]	10.8	17.3	8.6	5.6
Life Science-Biology—total schools	**100.0**	**100.0**	**100.0**	**100.0**
1962 or later	6.4	.0	5.9	28.5
1959–61	52.7	53.7	52.0	62.3
1956–58	13.3	.0	15.6	2.7
1953–55	2.2	.0	2.6	.0
1950–52	2.9	.0	3.5	.0
Before 1950	.0	.0	.0	.0
None and nonresponse[1]	22.4	46.3	20.5	6.5
Physical Science—total schools	**100.0**	**100.0**	**100.0**	**100.0**
1962 or later	16.2	22.9	14.4	18.0
1959–61	53.4	32.7	59.8	40.5
1956–58	17.0	22.7	13.0	41.6
1953–55	1.1	.0	1.5	.0
1950–52	1.0	.0	1.4	.0
Before 1950	.0	.0	.0	.0
None and nonresponse[1]	11.3	21.8	9.9	.0
Earth Science—total schools	**100.0**	**100.0**	**100.0**	**100.0**
1962 or later	7.3	.0	8.3	3.4
1959–61	76.3	100.0	74.9	72.5
1956–58	3.7	.0	4.4	.0
1953–55	.9	.0	.0	10.4
1950–52	.0	.0	.0	.0
Before 1950	.0	.0	.0	.0
None and nonresponse[1]	11.8	.0	12.5	13.7
Earth-Space Science—total schools	**100.0**	**100.0**	**100.0**	**100.0**
1962 or later	.0	.0	.0	.0
1959–61	38.5	.0	39.8	.0
1956–58	19.3	.0	19.9	.0
1953–55	.0	.0	.0	.0
1950–52	.0	.0	.0	.0
Before 1950	.0	.0	.0	.0
None and nonresponse[1]	42.2	.0	40.3	100.0
Health Science—total schools	**100.0**	**100.0**	**100.0**	**100.0**
1962 or later	.0	.0	.0	.0
1959–61	40.5	.0	68.7	21.3
1956–58	28.8	55.7	15.6	.0
1953–55	1.5	.0	.0	19.8
1950–52	.0	.0	.0	.0
Before 1950	.0	.0	.0	.0
None and nonresponse[1]	29.2	44.3	15.6	58.9

[1]Because of the small incidence of nonresponse, this figure was combined with "None" in the data processing.

Table 17.—Percent of public junior high schools using supplementary material in science courses, by type of material, by grade, and by school size: United States, 1963

Type of material and grade	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
Locally prepared resource material used in place of a textbook	**12.3**	**14.3**	**11.4**	**13.0**
Grade 7	8.5	10.1	8.0	7.5
Grade 8	10.0	11.5	9.1	12.0
Grade 9	10.7	12.9	9.6	12.5
All three grades	7.4	8.6	7.0	6.5
Commercial wookbooks	**27.1**	**34.9**	**24.7**	**18.6**
Grade 7	14.1	23.8	10.9	5.2
Grade 8	16.6	26.9	13.2	7.9
Grade 9	24.0	33.6	20.7	17.6
All three grades	12.0	22.5	8.4	4.6
Locally prepared worksheets	**64.3**	**60.1**	**66.9**	**58.0**
Grade 7	51.8	52.9	53.4	33.4
Grade 8	58.1	52.5	60.8	54.3
Grade 9	60.7	56.9	63.3	52.4
All three grades	48.0	49.7	49.5	28.7

Table 18.—Percent of public junior high schools with school libraries, and their adequacy rating of selected science-related library material, by school size: United States, 1963

Science-related material and adequacy rating	School size			
	All sizes	1–499	500–1,499	1,500 and over
Schools with libraries	**100.0**	**100.0**	**100.0**	**100.0**
General reference books	**95.7**	**91.4**	**97.2**	**98.7**
Poor	1.5	1.4	1.8	.0
Fair	9.0	18.5	5.0	8.7
Good	41.6	40.2	42.7	37.8
Excellent	43.5	31.3	47.7	52.1
Not available	4.5	8.7	2.8	1.6
Science reference books	**96.1**	**91.4**	**97.8**	**98.7**
Poor	4.9	7.9	4.2	.0
Fair	21.7	30.8	17.6	23.9
Good	45.1	32.8	50.9	40.4
Excellent	24.4	19.9	25.1	34.3
Not available	3.9	8.7	2.2	1.3
Science books (other than adopted texts)	**94.9**	**89.9**	**96.7**	**97.8**
Poor	4.5	7.4	3.8	.0
Fair	26.8	34.0	24.8	17.8
Good	41.6	34.5	44.2	45.5
Excellent	22.0	14.0	23.9	34.2
Not available	5.1	10.1	3.3	2.6
Weekly science periodicals	**87.3**	**78.2**	**90.4**	**93.0**
Poor	7.8	10.7	6.9	5.2
Fair	21.3	18.7	22.3	22.6
Good	39.0	32.7	41.8	38.3
Excellent	19.1	16.2	19.4	27.0
Not available	12.8	21.8	9.6	7.0
Scientific journals	**75.2**	**58.9**	**81.0**	**84.8**
Poor	8.9	9.3	8.8	8.6
Fair	19.0	14.5	21.1	16.9
Good	32.1	27.1	33.8	35.6
Excellent	15.2	8.0	17.3	23.9
Not available	24.9	41.3	19.0	15.2
Popular science magazines	**91.0**	**77.4**	**95.8**	**98.7**
Poor	3.9	8.5	2.2	2.2
Fair	13.7	12.9	14.0	14.8
Good	41.9	29.9	46.4	46.1
Excellent	31.5	26.2	33.2	35.7
Not available	9.0	22.6	4.2	1.3
Professional science teaching periodicals	**63.9**	**52.4**	**69.1**	**60.9**
Poor	10.5	10.0	11.3	6.0
Fair	19.4	15.1	20.9	21.7
Good	23.0	38.0	23.2	24.8
Excellent	11.0	5.1	13.7	8.2
Not available	36.1	47.6	30.8	39.5
Paperback books (science)	**64.3**	**54.0**	**69.5**	**57.4**
Poor	15.9	16.9	15.7	14.3
Fair	23.9	21.0	25.7	19.5
Good	17.3	12.1	19.2	20.0
Excellent	7.3	4.1	9.0	3.9
Not available	35.7	46.0	30.5	42.6

NOTE.—Because of rounding, percents may not total 100.0.

Table 19.—Percent of public junior high schools by estimated number of titles[1] of science-related books (other than textbooks or encyclopedias), and mean and median number of titles per school, by school size: United States, 1963

Number of titles	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
0–25	4.6	9.2	3.0	2.0
26–50	4.6	10.7	2.4	.5
51–100	7.5	9.7	6.9	5.0
101–200	10.0	16.0	7.8	6.8
201–400	15.3	13.2	16.2	15.7
401–600	13.1	3.6	16.7	17.3
601–800	4.9	.4	6.3	9.4
801–1,000	4.3	.0	5.2	12.6
1,000 or more	7.1	2.5	8.1	15.7
Item nonresponse	28.5	34.8	27.4	15.0
Mean number of titles	452.4	239.9	504.6	667.9
Median number of titles	522.7	267.8	565.46	659.3

[1]Exclusive of duplicate copies with the same title.

Table 20.—Percent of public junior high schools by availability of certain science-related classroom reference materials, by school's adequacy rating and by school size: United States, 1963

Type of material and adequacy rating	School size			
	All sizes	1–499	500–1,499	1,500 and over
Schools with libraries	**100.0**	**100.0**	**100.0**	**100.0**
General references and science textbooks other than adopted texts.				
Either or both available	97.6	97.1	97.8	97.4
Both available	92.0	91.2	92.5	90.0
Neither available	2.4	2.9	2.2	3.0
General references				
Poor	14.7	19.0	12.9	14.3
Fair	32.3	29.8	33.8	29.1
Good	35.6	36.5	35.0	37.8
Excellent	11.7	8.2	13.0	12.6
Not available	5.8	6.6	5.3	6.5
Science textbooks other than adopted texts				
Poor	11.1	14.9	9.8	8.7
Fair	33.8	32.8	34.8	29.1
Good	38.7	41.4	37.7	37.8
Excellent	11.6	5.8	13.4	17.8
Not available	4.7	5.1	4.3	6.5
Availability of any of the above from outside the classroom				
Poor	4.6	3.1	5.0	6.5
Fair	21.9	27.0	20.0	18.7
Good	41.0	41.1	41.1	44.3
Excellent	20.9	17.6	22.1	22.2
Not available	11.5	11.1	11.8	8.7

NOTE.—Because of rounding, percents may not total 100.0.

Table 21.—Percent of public junior high schools having selected audiovisual aids for science instruction, by degree of availability and by school size: United States, 1963

Audiovisual aid and degree of availability	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
Commercial charts				
Readily available	60.8	56.1	62.6	62.8
Limited availability	32.6	35.9	31.2	32.5
Unavailable	6.6	8.0	6.2	4.8
Homemade charts				
Readily available	48.0	47.4	48.0	49.7
Limited availability	38.4	38.7	38.1	39.7
Unavailable	13.6	13.9	13.9	10.6
Commercial pamphlets				
Readily available	57.6	53.7	58.8	62.7
Limited availability	33.7	30.1	35.4	32.4
Unavailable	8.6	16.2	5.9	4.9
Micro-projector				
Readily available	69.6	60.5	72.0	82.5
Limited availability	11.2	13.8	10.6	7.0
Unavailable	19.2	25.7	17.4	10.5
Slide/filmstrip projector				
Readily available	93.9	90.3	95.2	96.1
Limited availability	5.3	8.2	4.2	3.9
Unavailable	.8	1.4	.6	.0
Overhead projector				
Readily available	54.4	35.7	61.1	65.5
Limited availability	13.3	10.3	14.9	10.4
Unavailable	32.3	54.0	24.0	24.1
Opaque projector				
Readily available	67.1	52.4	73.4	66.4
Limited availability	15.2	13.4	15.2	22.5
Unavailable	17.7	34.2	11.5	11.1
Commercial models (ear, eye, torso, etc.)				
Readily available	61.2	45.5	64.9	86.5
Limited availability	22.7	19.1	25.9	7.7
Unavailable	16.1	35.4	9.2	5.7
Sound motion pictures				
Readily available	80.4	68.6	85.2	81.8
Limited availability	16.9	24.5	13.5	18.2
Unavailable	2.7	6.9	1.3	.0
Silent motion pictures				
Readily available	45.3	37.4	49.9	33.7
Limited availability	17.7	19.5	17.0	16.4
Unavailable	37.0	43.0	33.0	49.9
Television, broadcast				
Readily available	27.8	29.1	25.6	42.8
Limited availability	25.1	17.4	27.1	36.2
Unavailable	47.1	53.5	47.3	21.0
Television, closed circuit				
Readily available	4.5	4.8	3.7	10.8
Limited availability	3.4	3.9	2.5	9.8
Unavailable	92.1	91.3	93.8	79.4
Filmstrips, slides				
Readily available	10.1	10.5	10.2	7.2
Limited availability	.9	1.4	.8	.0
Unavailable	23.4	29.5	20.0	30.3
Flannelboard				
Readily available	23.9	21.6	24.6	25.7
Limited availability	52.7	48.8	55.4	44.0
Unavailable	22.6	26.5	21.2	19.9
Commercial displays				
Readily available	48.8	40.3	51.7	54.7
Limited availability	28.7	33.2	27.1	25.3
Unavailable	6.1	1.4	7.7	8.6

NOTE.—Because of rounding, percents may not total 100.0.

Table 22.—Percent of public junior high school pupils enrolled in science courses having access to certain science facilities, by grade level and by school size: United States, 1963

Grade level and science facility	School size				
	All sizes	1–499	500–999	1,000–1,499	1,500 and over
Pupils in all science classes	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Combination classroom-laboratory	75.1	76.0	77.6	73.3	70.8
Separate recitation room and laboratory	8.3	12.9	9.7	4.3	8.4
No laboratory[1]	20.8	16.8	17.9	24.8	24.5
Room primarily equipped for nonscience teaching	29.6	28.9	30.2	22.9	39.5
Pupils in grade 7 science classes	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Combination classroom-laboratory	59.5	54.5	64.7	55.1	54.6
Separate recitation room and laboratory	5.8	7.8	5.4	4.3	8.3
No laboratory[1]	35.6	37.0	31.3	41.7	36.7
Room primarily equipped for nonscience teaching	23.9	25.4	24.2	19.4	29.8
Pupils in grade 8 science classes	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Combination classroom-laboratory	65.0	55.7	65.0	65.7	68.5
Separate recitation room and laboratory	5.2	8.0	4.6	4.7	6.1
No laboratory[1]	31.0	35.8	30.9	32.4	26.9
Room primarily equipped for nonscience teaching	26.6	25.1	24.2	22.6	38.6
Pupils in grade 9 science classes	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Combination classroom-laboratory	73.0	78.0	74.5	71.0	67.9
Separate recitation room and laboratory	7.8	12.5	9.8	3.2	6.6
No laboratory[1]	20.9	14.6	17.4	26.4	27.1
Room primarily equipped for nonscience teaching	26.7	27.8	27.5	16.9	41.5

[1]Schools having neither combination classroom-laboratory nor separate recitation room and laboratory facilities, and nonresponse.

NOTE.—Since multiple responses are included, percents will not total 100.0.

Table 23.—Percent of public junior high schools reporting combination classroom-laboratory facilities, by course: United States, 1963

Course	Grade level at which course was offered			
	All grades	Grade 7	Grade 8	Grade 9
Schools offering course	**100.0**	**100.0**	**100.0**	**100.0**
General Science	74.2	59.5	62.8	72.8
Life Science-Biology	65.2	61.2	43.0	68.3
Physical Science	71.4	95.5	67.6	70.1
Earth Science	59.3	27.0	75.3	58.4
Earth-Space Science	61.0	.0	65.6	40.0
Health Science	41.1	66.5	42.7	.0

Table 24.—Percent of public junior high schools according to utilities available in science classrooms, by school size: United States, 1963

Utility available	School size				
	All sizes	1–499	500–999	1,000–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
For teacher demonstration					
Water	96.7	93.8	97.5	98.3	98.6
Gas	91.8	83.2	94.3	95.9	98.1
Electrical outlet	98.1	97.1	98.2	98.3	100.0
At pupil laboratory tables					
Water	26.0	32.8	25.8	19.5	18.7
Gas	27.2	32.5	27.3	21.9	19.3
Electrical outlet	29.8	36.4	29.6	25.1	18.9
To both teachers and pupils					
Water	25.5	31.4	25.6	19.5	18.7
Gas	26.3	31.1	26.4	21.9	19.3
Electrical outlet	29.7	36.4	29.4	25.1	18.9

Table 25.—Percent of public junior high schools by type of science storage, by school size: United States, 1963

Type of storage	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
Separate storeroom				
Available	75.2	55.8	81.6	90.7
Not available	20.6	35.6	15.5	9.3
Nonresponse	4.2	8.5	2.9	.0
Cupboards in classroom				
Available	88.2	86.6	88.3	93.0
Not available	9.7	12.0	9.0	7.0
Nonresponse	2.2	1.5	2.7	.0
Both storeroom and cupboards	66.1	47.8	71.5	86.5

NOTE.—Because of rounding, percents may not total 100.0.

Table 26.—Percent of public junior high schools reporting various financial practices related to the purchase of science equipment, by school size: United States, 1963

Financial practice	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
Annual budget provides for:				
New equipment	73.3	55.3	79.4	86.9
Consumable materials	75.7	56.9	82.0	90.9
Both new equipment and consumable materials	69.5	48.8	76.6	83.7
Neither new equipment nor consumable materials	18.5	34.0	13.3	5.3
Direct teacher purchase of supplies permitted	23.2	26.7	21.9	21.7
Equipment purchases increased over 2 years previous	76.4	75.2	76.3	82.3
Laboratory fees:				
Charged	10.0	12.0	8.9	12.1
Not charged	89.3	88.0	90.1	87.3
Not charged because prohibited[1]	20.1	13.6	21.8	28.8

[1]Nonresponse: 17.9–25.7 percent.

Table 27.—Percent of public junior high schools reporting various financial practices related to the purchase of science equipment, by geographic region: United States, 1963

Financial practice	Geographic region								
	All regions	New England	Mideast	Great Lakes	Plains	Southeast	Southwest	Rocky Mountains	Far West
Total schools	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Annual budget provided for:									
New equipment	73.3	62.3	83.8	81.8	65.2	57.9	82.0	68.3	81.4
Consumable materials	75.7	65.6	90.1	81.2	69.4	58.8	77.3	75.9	87.6
Both equipment and materials	69.5	58.9	83.3	78.5	63.1	49.9	75.6	68.3	78.9
Neither equipment nor materials	18.5	22.4	8.8	13.9	26.4	30.9	16.3	21.9	7.5
Direct teacher purchase of supplies permitted	23.2	8.6	19.9	28.2	10.5	31.6	27.4	16.2	23.9
Equipment purchases increased over 2 years previous	76.4	64.2	81.1	78.4	85.7	63.7	80.8	79.2	83.1
Laboratory fees:									
Charged	10.0	.0	2.9	15.3	9.3	7.4	26.9	15.4	4.2
Not charged	89.3	95.0	96.5	83.8	90.7	92.1	73.1	84.6	95.5
Not charged because prohibited	20.1	21.7	27.7	7.1	10.8	18.3	18.9	23.0	33.1

Table 28.—Percent of public junior high schools by estimated expenditures for science equipment and materials (other than books), and mean and median expenditures, by geographic region: United States, 1963

Estimated expenditure	Geographic region								
	All regions	New England	Mideast	Great Lakes	Plains	Southeast	Southwest	Rocky Mountains	Far West
Total schools	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
All schools expending funds	73.4	60.9	76.9	82.4	64.6	70.0	77.0	74.8	73.6
Below $100	3.6	.0	1.3	4.1	1.1	8.7	2.8	4.4	1.7
$100 to 199	7.0	1.7	2.4	10.4	4.2	12.7	2.5	17.5	5.5
200 to 399	18.6	10.0	19.3	26.3	13.9	17.1	22.1	12.0	18.8
400 to 599	16.0	10.0	19.3	8.1	10.4	15.4	27.0	9.6	19.4
600 to 799	6.3	5.0	6.8	6.7	5.2	4.8	4.4	8.8	10.7
800 to 999	5.3	.0	8.7	6.6	6.6	4.3	2.5	3.0	6.9
1,000 to 1,999	9.5	16.9	8.5	14.5	9.3	6.0	8.6	15.1	6.5
2,000 or more	7.0	17.2	10.6	5.7	13.9	.9	7.1	4.4	4.0
None spent	4.9	15.5	.2	3.3	3.2	11.0	2.5	2.2	2.1
Item nonresponse	21.7	23.6	23.0	14.2	32.2	18.9	20.5	23.0	24.3
Mean expenditure	$810.27	$1,387.63	$1,096.60	$694.24	$1,019.70	$440.38	$939.20	$719.00	$634.63
Median expenditure	493.90	$1,218.96	559.78	408.77	704.10	359.25	482.51	472.13	511.52

NOTE.—Excludes National Defense Education Act Funds. Because of rounding percents may not total 100.0.

Table 29.—Percent of public junior high schools sponsoring science clubs, by number of teacher-sponsors and pupil-members, and by school size: United States, 1963

Item	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	100.0	100.0	100.0	100.0
Schools sponsoring science clubs	49.4	41.7	51.3	61.4
Nonresponse	1.0	1.4	.7	1.3
Teacher-sponsors per school	100.0	100.0	100.0	100.0
1	39.5	44.5	38.8	31.5
2	23.7	14.8	26.0	29.0
3	17.6	24.7	16.0	11.6
4	6.0	6.8	5.6	6.7
5 or more	4.3	.0	4.9	10.4
Nonresponse	9.0	9.1	8.7	10.6
Pupil-members per school	100.0	100.0	100.0	100.0
1–10	10.0	10.8	9.5	12.1
11–25	17.4	14.9	18.5	15.4
26–50	18.1	12.5	18.3	30.8
51–100	8.6	6.2	9.1	10.8
101 or more	4.6	10.1	2.8	3.3
Nonresponse	41.4	45.4	41.8	27.8

NOTE.—Percents may not total 100.0 because of rounding.

Table 30.—Percent of public junior high schools participating in interschool science fairs, by grade level and by school size: United States, 1963

Grade	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	100.0	100.0	100.0	100.0
Any grade	60.5	44.4	65.8	73.7
All three grades	26.5	19.9	28.9	30.3
Grade 7	32.2	28.1	33.8	33.3
Grade 8	39.3	24.6	43.4	58.9
Grade 9	47.4	30.6	52.4	65.5

Table 31.—Number and percent of school-sponsored science fair projects in public junior high schools, by grade level at which project was prepared, and by school size: United States, 1963

Grade level	School size							
	All sizes		1–499		500–1,499		1,500 and over	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All grades	**268,453**	**100.0**	**33,829**	**100.0**	**209,359**	**100.0**	**25,265**	**100.0**
Grade 7	66,971	24.9	6,261	18.5	55,625	26.6	5,085	20.1
Grade 8	89,008	33.2	12,893	38.1	65,877	31.5	10,239	40.5
Grade 9	112,474	41.9	14,675	43.4	87,858	42.0	9,941	39.3

Table 32.—Percent of public junior high schools participating in inservice education programs for science teachers, by type of program, source of funds, and geographic region: United States, 1963

Type of program	Geographic region								
	All regions	New England	Mideast	Great Lakes	Plains	Southeast	Southwest	Rocky Mountains	Far West
Total schools	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
School- or system-sponsored programs	65.8	26.7	75.6	69.9	61.0	68.7	61.0	47.4	79.4
Summer curriculum development	26.0	16.9	32.5	20.1	23.3	22.4	20.2	26.9	42.8
National Science Foundation institutes	66.3	50.3	78.7	70.1	79.2	50.6	66.5	81.4	63.2
Other programs—source of funds									
Any source	40.6	46.1	45.7	49.3	38.6	36.8	34.4	25.0	42.1
Local board of education	25.3	29.1	28.2	36.7	19.9	16.4	25.8	14.0	30.9
State department of education	9.1	10.3	10.7	2.7	8.3	16.7	8.6	2.2	3.7
Private	5.5	3.3	6.8	12.4	3.2	6.5	1.7	2.2	2.5
Other	9.0	8.3	11.1	7.5	10.4	6.1	8.1	8.8	12.8

Table 33.—Percent of public junior high schools reporting the availability of specialists or consultants to science teachers, by type, source, and school size: United States, 1963

Type and source of specialist	School size			
	All sizes	1–499	500–1,499	1,500 and over
Total schools	**100.0**	**100.0**	**100.0**	**100.0**
Curriculum *or* science specialist				
Any sources	78.1	64.8	82.0	93.4
City or county school department	51.5	39.0	53.9	77.8
State department of education	38.9	38.4	40.6	24.7
College/university	26.5	25.5	28.6	11.2
Helping teacher (several schools)	13.2	10.2	12.0	35.5
Helping teacher (single school)	4.5	3.5	3.6	15.2
Local professional people	29.1	19.9	33.7	21.9
Other	3.5	.4	4.5	6.1
General curriculum specialist				
Any sources	44.2	48.0	42.1	48.2
City or county school department	27.7	29.7	26.6	30.4
State department of education	17.6	23.9	15.8	10.6
College/university	7.9	10.2	7.6	2.7
Helping teacher (several schools)	5.3	6.0	4.7	8.0
Helping teacher (single school)	2.7	3.2	1.9	8.9
Local professional people	5.5	9.9	3.9	3.4
Other	1.6	.4	2.1	1.4
Science specialist				
Any sources	57.6	36.2	64.7	74.9
City or county school department	25.7	9.3	29.2	56.4
State department of education	22.1	15.6	25.7	14.6
College/university	19.0	15.3	21.8	8.5
Helping teacher (several schools)	8.0	4.1	7.3	28.1
Helping teacher (single school)	1.7	.4	1.8	6.3
Local professional people	23.8	10.0	30.2	18.5
Other	2.0	.0	2.6	4.7

Table 34.—Percent of public junior high schools reporting the availability of specialists or consultants to science teachers, by type, source, and geographic region: United States, 1963

Type and source of specialist	Geographic region								
	All regions	New England	Mideast	Great Lakes	Plains	Southeast	Southwest	Rocky Mountains	Far West
Total schools	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Curriculum *or* science specialist									
Any source	78.1	62.8	73.0	84.2	77.7	77.1	81.4	69.6	88.8
City or county school department	51.5	40.6	50.1	51.6	38.3	59.8	40.4	42.2	71.7
State department of education	38.9	22.0	27.7	35.2	52.7	54.4	35.8	38.4	32.7
College/university	26.5	22.2	13.9	27.8	31.3	30.6	36.1	23.0	25.0
Helping teacher (several schools)	13.2	5.0	11.3	14.4	3.5	18.6	11.9	6.6	21.4
Helping teacher (one school)	4.5	.0	4.2	6.3	3.2	3.9	4.5	6.6	6.4
Local professional people	29.1	16.9	30.3	29.0	21.2	27.3	38.4	29.6	32.8
Other	3.5	5.3	7.4	1.1	.0	2.8	2.5	8.8	2.7
General curriculum specialist									
Any source	44.2	36.1	35.5	42.8	43.0	47.4	48.2	56.5	48.1
City or county school department	27.7	22.2	21.4	24.5	26.1	38.0	19.2	31.3	34.5
State department of education	17.6	10.3	11.0	12.6	25.0	25.1	20.5	25.2	11.0
College/university	7.9	10.5	4.5	3.2	13.6	8.1	15.3	8.8	3.4
Helping teacher (several schools)	5.3	1.7	3.4	8.3	.3	9.2	3.2	6.6	5.3
Helping teacher (single school)	2.7	.0	2.1	4.1	1.1	2.9	2.8	4.4	3.9
Local professional people	5.5	.0	.8	1.6	8.3	8.9	10.8	8.8	4.2
Other	1.6	5.3	4.0	.8	.0	.9	.8	2.2	.0
Science specialist									
Any source	57.6	42.0	58.2	60.4	52.9	58.7	52.0	43.6	75.0
City or county school department	25.7	20.0	28.7	27.1	12.2	24.4	21.2	14.0	46.1
State department of education	22.1	13.4	17.2	22.6	30.7	30.6	15.3	15.4	21.6
College/university	19.0	11.7	9.4	24.6	17.7	24.1	20.9	16.4	21.7
Helping teacher (several schools)	8.0	3.3	7.9	6.2	3.2	9.4	8.7	.0	16.4
Helping teacher (single schools)	1.7	.0	2.1	2.1	2.1	.9	1.7	2.2	2.5
Local professional people	23.8	16.9	29.5	27.4	12.9	19.0	27.6	23.0	28.5
Other	2.0	.0	3.4	.3	.0	1.8	1.7	8.8	2.7

Appendix B

Technical Notes

THIS APPENDIX DESCRIBES the sampling design used for the study, the population from which the sample was drawn, the response rate, and the adjustment of the sampling fractions as a basis for deriving estimates. It also provides measures relative to the reliability of the results.

Universe of Inquiry

The universe of inquiry used in selecting the sample was the listing of public junior high schools in the United States in *Public Secondary Schools, Statistics of Education in the United States, 1958–59* (OE–20032–59). The universe was limited to those public junior high schools having grades 7, 8 and 9, and no other grades.

Sample Design and Sample Selection Plan

The sample design provided for a one-stage stratified random sample. The schools were stratified by 3 enrollment size groups, i.e., (1) 1,500 and over, (2) 500–1,499, and (3) under 500. Those schools with enrollment size of 1,500 and over were selected with certainty. The remaining schools were arranged alphabetically by State within each region (regions correspond to those as set up by the Office of Business Economics) and the two enrollment size groups under 1,500. This, in effect, also stratified the schools geographically.

After a random start the schools in each stratum were selected in a systematic manner in accordance with the sampling ratios shown in table *a*.

Response Rate

The overall response rate was 90.4 percent; the response rates by region and enrollment size are shown in table *a*. Because of the absence of relevant data on which to base ad-

Table a.—Number of schools in universe and sample, sampling fraction, response rate, and inflation factors: United States, 1963

[—=Inapplicable]

Enrollment size and item	Total	Geographic region							
		New England	Mideast	Great Lakes	Plains	Southeast	Southwest	Rocky Mountains	Far West
All schools									
Universe	3,133	203	554	425	310	680	421	162	378
Sample	882	53	193	123	74	139	107	40	153
Nonresponse	85	6	14	12	4	6	21	5	17
Response rate	90.4%	88.7%	93.8%	89.4%	94.6%	95.7%	80.4%	87.5%	88.9%
1,500 and over									
Universe	176	0	64	15	6	13	13	4	61
Sample	176	0	64	15	6	13	13	4	61
Sampling fraction	1:1.0	0	1:1.0	1:1.0	1:1.0	1:1.0	1:1.0	1:1.0	1:1.0
Nonresponse	28	0	5	1	0	2	6	1	13
Response rate	84.1%	0	92.2%	93.3%	100.0%	84.6%	53.8%	75.0%	78.7%
Inflation factor	—	0	1.08	1.07	1.00	1.18	1.86	1.33	1.27
500–1,499									
Universe	1,799	139	335	293	161	294	221	96	260
Sample	596	47	117	97	53	93	73	31	85
Sampling fraction	1:3.0	1:3.0	1:2.9	1:3.0	1:3.0	1:3.2	1:3.0	1:3.1	1:3.1
Nonresponse	49	6	9	11	4	1	10	4	4
Response rate	91.8%	87.2%	92.3%	88.7%	92.5%	98.9%	86.3%	87.1%	95.3%
Inflation factor	—	3.39	3.10	3.41	3.29	3.20	3.51	3.56	3.21
Under 500									
Universe	1,158	64	155	117	143	373	187	62	57
Sample	110	6	12	11	15	33	21	5	7
Sampling fraction	1:10.5	1:10.7	1:12.9	1:10.6	1:9.5	1:11.3	1:8.9	1:12.4	1:8.1
Nonresponse	8	0	0	0	0	3	5	0	0
Response rate	92.7%	100.0%	100.0%	100.0%	100.0%	90.9%	76.2%	100.0%	100.0%
Inflation factor	—	10.67	12.92	10.64	9.53	12.43	11.69	12.40	8.14

justments for nonresponse and because of the relatively high response rate, the nonresponding schools were considered to have the same characteristics as those schools that responded. The sampling fractions were then adjusted to provide for nonresponse. For example, 335 schools in the Mideast region were in enrollment size 500–1,499. With a sampling fraction of 1:2.9, 117 of these schools fell into the sample. Nine of the 117 schools did not respond. Therefore, the sampling fraction was adjusted to 1:3.1. Thus, the sampling fractions were recomputed as the ratio of useable returns to total schools. It seems unlikely that this procedure for the treatment of nonresponse is a source of serious bias at the national level. At the regional and enrollment size level, particularly in those strata where a lower proportion of schools responded, there may be a higher nonresponse bias.

Estimation Procedure

The statistics developed in this survey are estimates based on inflating the sample data by an inflation factor that is the inverse of the probability by which a school was selected to fall in the sample, and adjusting this sampling fraction to account for nonresponse as described above. The inflation factors used are shown in table *a*.

Limitations of the Data

Since the estimates are based on a sample, they may differ somewhat from the figures that would have been obtained if a complete count of all junior high schools having grades 7, 8 and 9 and no other grades had been taken using the same schedules, instructions, and procedures. As in any survey work the results are subject to errors of response and of reporting as well as sampling variability.

The major types of nonsampling errors in this report are probably errors in classification made by the respondents, clerical coding and editing errors, and errors occuring during the machine processing operations. Efforts were made to keep errors at a minimum. Some bias is also involved in the estimates, as no effort was made to include in the universe those new junior high schools that were added to the universe during 1958–59 and 1962–63. The magnitude of this bias is not known as there are no comparable data for 3-year junior high schools for 1962–63.

The standard error is primarily a measure of sampling variability, that is, of the variations that occur by chance because the sample rather than the whole of the population is surveyed. As calculated for this report, the standard error also partially measures the effect of response errors, but does not measure any systematic biases in the data. The chances are 68 out of 100 that an estimate from the sample would differ from a complete census figure by less than the standard error. The chances are 95 out of 100 that the difference would be less than twice the standard error.

The figures presented in tables *b* and *c* are approximations to the standard errors of various estimates shown in the report. As a result, the table of standard errors indicates the order of magnitude of the standard errors rather than the precise standard error for any specific item.

Table *b* provides approximate standard errors for estimated numbers.

Linear interpolation will provide reasonably accurate estimates for numbers not shown. For example, basic table 1 shows that the number of junior high schools in the Mideast region with enrollment under 500 is 113. The interpolated standard error for 113 from table *b* is about 11. Thus, the chances are 68 out of 100 that a complete census would have shown a figure differing from the sample estimate by no more than 11. The chances are 95 out of 100 that a complete census would have shown a figure differing by no more than 22 (twice the standard error) from the estimate 113.

Table b.—Approximate standard errors for estimated numbers

Size of estimate	One standard error
100	10
200	15
500	25
1,000	40
2,000	70
5,000	125
25,000	345
50,000	560
100,000	840
500,000	2,955
1,000,000	5,200

Table c.—Approximate standard errors for estimated percentages

One standard error

Estimated percentage	Base of percentage						
	500	1,000	2,500	5,000	10,000	25,000	50,000
1 or 99	0.22	0.17	0.11	0.09	0.07	0.06	0.05
2 or 98	.33	.24	.17	.14	.12	.09	.08
5 or 95	.53	.41	.30	.26	.23	.17	.14
10 or 90	.77	.62	.49	.42	.35	.28	.22
25 or 75	1.17	1.05	.85	.71	.60	.45	.34
50	1.54	1.41	1.06	.94	.76	.55	.40

The reliability of an estimated percentage computed using sample totals for the numerator and denominator depends upon both the size of the percentage and the size of the total on which the percentage is based. Generally, estimated percentages are relatively more reliable than the corresponding absolute estimates of the numerator of the percentage—particularly if the percentage is high. Table *c* shows the approximate standard errors of estimated percentages for different sizes of the base of the percentage. For example, table 1 shows that the 113 junior high schools in the Mideast is an estimated 13.3 percent of the total number of 848 junior high schools with enrollment under 500. Linear interpolation in table *c* shows that the approximate standard error of 13.3 percent with a base of 848 is approximately .75 percent. Thus, the chances are 68 out of 100 that a complete census would have disclosed a figure differing by no more than .75 percent from the estimated 13.3 percent, and the chances are 95 out of 100 that a census figure would have differed from the 13.3 percent by not more than 1.5 percent (twice the standard error).

The table of standard errors is to be applied differently in the following two situations:

1. For a difference between two sample estimates, the standard error is approximately the square root of the sum of the squares of a standard error of each estimate considered separately. This formula will represent the actual standard error quite accurately for the difference

between estimates of the same characteristics in two different geographic areas, or for the difference between separate and uncorrelated characteristics in the same area. If, however, there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error.

2. For a difference between two sample estimates—one of which represents a subclass of the other—the tables can be used directly with the difference considered as the sample estimate.

Appendix C

OE-2003 (Rev. 1/63
Formerly OE-BSL-836-1

Questionnaire

BUREAU BUDGET NO. 51-61-10.1
Approval Expires: 9-30-63

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF EDUCATION
WASHINGTON 25, D.C.

STATUS OF SCIENCE TEACHING IN PUBLIC JUNIOR HIGH SCHOOLS
SPRING 1963

DO NOT WRITE IN THIS BLOCK	1	2	3	4	5

PLEASE RETURN THE QUESTIONNAIRE TO THE OFFICE OF EDUCATION WITHIN THE NEXT TEN DAYS IN THE ENCLOSED, SELF-ADDRESSED, POSTAGE-FREE ENVELOPE

If address is incomplete or incorrect, please correct it

This survey is designed to gather definitive information regarding status of science teaching in those public junior high schools having grades 7, 8, and 9 inclusive, and no other grades. The sample of schools has been selected so that generalizable data regarding the schools and their programs may be collected. It includes items pertaining to over-all school organization and program and basic data regarding teacher personnel.

☐ Check here, if your school does not have all three of the grades 7, 8, 9, or if it includes any grades other than these three; and return the uncompleted questionnaire in the enclosed envelope.

If your school has all three grades 7, 8, and 9, complete the following items. The assistance of one teacher from each grade level will be necessary to complete item number 11.

Definitions of Terms Used

TEACHER - A person employed to instruct pupils or students in a situation where the teacher and the pupils or students are in the presence of each other.

SUBSTITUTE - A teacher assigned on a day to day basis, temporarily replacing a teacher. For purposes of this survey:
Include substitutes with regular teaching assignments.
Exclude substitutes assigned on a day to day basis temporarily replacing regular teacher

FULL-TIME - Those who occupy positions the duties of which require them to be on the job on school days, throughout the school year, at least the number of hours the schools in the system are in session.

PART-TIME - Those who occupy positions the duties of which require less than full-time service. This includes those employed full-time for part of the school year, part time for all of the school year, and part time for part of the school year.

This questionnaire was completed by:	Official Position	Date

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STATUS OF SCIENCE TEACHING IN PUBLIC JUNIOR HIGH SCHOOLS

1. TOTAL NUMBER OF REGULARLY EMPLOYED CLASSROOM TEACHERS (ALL SUBJECTS) IN YOUR JUNIOR HIGH SCHOOL:

SEX	NO. FULL-TIME	NO. PART-TIME
Male		
Female		

3. SCHOOL ENROLLMENT

TOTAL NUMBER OF PUPILS ENROLLED

(Pupils who would have been in class in your school as of February 1, 1963, if all pupils were present)

GRADE LEVEL	TOTAL BOYS AND GIRLS	BOYS	GIRLS
7th			
8th			
9th			
TOTAL ENROLLED			

2. NUMBER OF REGULARLY EMPLOYED CLASSROOM TEACHERS WHO TEACH SCIENCE

NO. OF PERIODS OF SCIENCE TAUGHT PER WEEK	NUMBER OF TEACHERS WHO TEACH SCIENCE
1-5 periods per week	
6-10 periods per week	
11-15 periods per week	
16-20 periods per week	
21-25 periods per week	
26-30 periods per week	
31-25 periods per week	
36-40 periods per week	
TOTAL NO. SCIENCE TEACHERS	

4. Complete the question below in terms of its application to the science program in your school. Please follow carefully the directions for each item.

ITEM		GENERAL SCIENCE	OTHER SCIENCE COURSES (Write course titles in spaces below) course title	course title	course title
ACTUAL ENROLLMENT AS OF FEBRUARY 1 1963	7th grade				
	8th grade				
	9th grade				
NUMBER OF CLASS SECTIONS	7th grade				
	8th grade				
	9th grade				
NUMBER OF WEEKS OF SCIENCE INSTRUCTION PER REGULAR SCHOOL YEAR	7th grade				
	8th grade				
	9th grade				
CIRCLE GRADE LEVELS IN WHICH CREDIT IS GIVEN TOWARD HIGH SCHOOL GRADUATION (Circle "0" if no credit is given at any grade level)		0 7 8 9	0 7 8 9	0 7 8 9	0 7 8 9

WHAT IS THE LENGTH OF YOUR REGULAR SCHOOL YEAR?
(Number of days classes are in session?) No. of days _____

ORGANIZATION AND SCHEDULING

5a. Is your school organized with separately scheduled class periods for each subject?

	Yes	No
7th grade	1 ☐	2 ☐
8th grade	1 ☐	2 ☐
9th grade	1 ☐	2 ☐

If one or more of the above are checked yes, then answer 5b and 5c. If no, go to 5d.

5b. No. of regular class periods per day _____.

5c. Length of regular class periods in minutes, (do not include time for passing between classes)_____minutes.

5d. Are science classes grouped homogeneously in your school:

1 ☐ Yes (If yes, answer items 5e and 5f) 2 ☐ No (If no, go to item 5g)

5e. Rank the following criteria in the order of importance as the basis for the homogeneous grouping of science classes. Use "1" for most important, "2" for next in importance, etc. Use "0" for criteria not used in grouping pupils.

___APTITUDE TEST ___INTELLIGENCE TESTS

___ACHIEVEMENT TESTS ___PREVIOUS MARKS

___PUPIL'S INTEREST ___PARENTS RECOMMENTATIONS

___TEACHERS RECOMMENDATION ___OTHER CRITERIA (Specify)

5f. At what grade level is grouping generally done?

1 ☐ 7th GRADE 2 ☐ 8th GRADE 3 ☐ 9th GRADE 4 ☐ ALL GRADES

5g. What change in emphasis on homogeneous grouping in science in your school do you expect in the next two years?

1 ☐ MORE EMPHASIS 2 ☐ LESS EMPHASIS 3 ☐ SAME EMPHASIS

5h. Number of class periods per week devoted to each course:

ITEMS		GENERAL SCIENCE	OTHER SCIENCE COURSES (Write course titles in space below)		
			course title	course title	course title
THREE YEARS AGO (1959-1960)	7th grade				
	8th grade				
	9th grade				
PRESENT SCHOOL YEAR (1962-63)	7th grade				
	8th grade				
	9th grade				
ANTICIPATED THREE YEARS FROM NOW (1965-66)	7th grade				
	8th grade				
	9th grade				

6. FACILITIES AND EQUIPMENT

6a. BUDGET & FEES	YES	NO
Do you have an annual budget for the purchase of new equipment?	1 ☐	2 ☐
Do you have an annual budget for the purchase of consumable materials such as chemicals?	1 ☐	2 ☐
Are your teachers permitted to purchase equipment & supplies directly?	1 ☐	2 ☐
Do you charge a laboratory fee to cover breakage?	1 ☐	2 ☐
If no, are laboratory fees prohibited in your school or state?	1 ☐	2 ☐
Are your teachers permitted to spend the money from laboratory fees etc., at their discretion?	1 ☐	2 ☐
Have your expenditures for laboratory & demonstration equipment increased in the past two years?	1 ☐	2 ☐
Estimate amount spent and committed by your school for science equipment & materials (not books) for this year. DO NOT INCLUDE FUNDS RECEIVED FROM THE NATIONAL DEFENSE EDUCATION ACT. Check if none was spent $_____		

6b. NATIONAL DEFENSE EDUCATION ACT	YES	NO
Have you remodeled facilities with money from the National Defense Education Act?	1 ☐	2 ☐
Have you used money from the National Defense Education Act to purchase new equipment?	1 ☐	2 ☐

6c. Circle the grade levels of the courses for which each of the following facilities is available:

FACILITIES	GENERAL SCIENCE	OTHER SCIENCE COURSES (Write course titles in spaces below) course title	course title	course title
COMBINATION CLASSROOM-LABORATORY	7 8 9	7 8 9	7 8 9	7 8 9
SEPARATE RECITATION ROOM & LAB	7 8 9	7 8 9	7 8 9	7 8 9
A FEW SPECIAL FACILITIES FOR TEACHING SCIENCE IN CLASSROOM	7 8 9	7 8 9	7 8 9	7 8 9
ROOM PRIMARILY EQUIPPED FOR NON-SCIENCE TEACHING	7 8 9	7 8 9	7 8 9	7 8 9
NUMBER OF SPECIAL FACILITIES FOR THE TEACHING OF SCIENCE	7 8 9	7 8 9	7 8 9	7 8 9
OTHER (Specify)	7 8 9	7 8 9	7 8 9	7 8 9

6d. DOES YOUR SCHOOL HAVE A LIBRARY? Yes ☐ No ☐ (If no, go to 6e)

IF YES, how adequate is the collection of following types of reference materials?	NONE	POOR	FAIR	GOOD	EXCELLENT
GENERAL REFERENCES (encyclopedias, etc.)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
GENERAL REFERENCE BOOKS ON SCIENCE SUBJECTS	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
SCIENCE BOOKS OTHER THAN THE ADOPTED TEXTS	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
WEEKLY PERIODICALS DEVOTED EXCLUSIVELY TO SCIENCE (e.g. "Science Newsletter")	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
SCIENCE JOURNALS (such as Scientific American or Scientific Monthly	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
POPULAR SCIENCE MAGAZINES (such as Popular Science Monthly or Popular Mechanics	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

6d. DOES YOUR SCHOOL HAVE A LIBRARY (continued)	NONE	POOR	FAIR	GOOD	EXCELLENT
PROFESSIONAL SCIENCE TEACHING MAGAZINES (such as the Science Teacher or School Science and Mathematics	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
CURRENT "PAPER BACK" TITLES IN THE FIELD OF SCIENCE	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

6e. HOW ADEQUATE ARE THE REFERENCE MATERIALS IN YOUR CLASSROOMS (consider number and recency)?

REFERENCE MATERIALS	NONE AVAILABLE	POOR	FAIR	GOOD	EXCELLENT
General references other than textbooks on science	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Science textbooks other than the adopted text	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Indicate the availability of the above to the science classrooms when needed if not physically present in the rooms	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

6f. HOW MANY TITLES OF SCIENCE RELATED BOOKS ARE IN YOUR LIBRARY?
(not textbooks or encyclopedias) Give your best estimate of no. of titles_____

6g. Check to indicate the availability of the following items to your science teachers:

1. SENSORY AIDS	READILY AVAILABLE	LIMITED AVAILABILITY	NOT AVAILABLE
Commercial charts	1 ☐	2 ☐	3 ☐
Homemade charts	1 ☐	2 ☐	3 ☐
Commercial pamphlets	1 ☐	2 ☐	3 ☐
Micro-projector	1 ☐	2 ☐	3 ☐
Slide and/or film strip projector	1 ☐	2 ☐	3 ☐
Overhead projector	1 ☐	2 ☐	3 ☐
Opaque projector	1 ☐	2 ☐	3 ☐
Purchased models (eyes, ear, torso, etc.)	1 ☐	2 ☐	3 ☐
Sound motion pictures	1 ☐	2 ☐	3 ☐
Silent motion pictures	1 ☐	2 ☐	3 ☐
Television: Broadcast	1 ☐	2 ☐	3 ☐
Television: Closed Circuit	1 ☐	2 ☐	3 ☐
Film strips and/or slides	1 ☐	2 ☐	3 ☐
Flannel board	1 ☐	2 ☐	3 ☐
Commercial displays	1 ☐	2 ☐	3 ☐
Other (specify):			
_____	1 ☐	2 ☐	
_____	1 ☐	2 ☐	
_____	1 ☐	2 ☐	
_____	1 ☐	2 ☐	

2. UTILITIES		YES	NO
FOR TEACHER DEMONSTRATION	Water	1 ☐	2 ☐
	Gas	1 ☐	2 ☐
	Electrical Outlets	1 ☐	2 ☐
AT PUPIL'S LAB TABLE	Water	1 ☐	2 ☐
	Gas	1 ☐	2 ☐
	Electrical Outlets	1 ☐	2 ☐

3. STORAGE SPACE	YES	NO
Separate storage room	1 ☐	2 ☐
Cupboards in the classroom	1 ☐	2 ☐
Other (specify):		
_____	1 ☐	
_____	1 ☐	

4. SPECIAL FACILITIES	YES	NO
Greenhouse	1 ☐	2 ☐
Facilities for housing small animals	1 ☐	2 ☐
Weather equipment	1 ☐	2 ☐
A planetarium in the school	1 ☐	2 ☐
A planetarium with reasonable travel distance	1 ☐	2 ☐
Other (specify):	1 ☐	
_____	1 ☐	

7 YOUTH ACTIVITIES

7a. Does your school sponsor a science club? 1 ☐ YES (if checked answer 7b) 2 ☐ NO	7b. NUMBER OF TEACHER SPONSORS: _____ NUMBER OF MEMBERS - 7th grade _____ 8th grade _____ 9th grade _____
7c. Does your school sponsor a science fair? 1 ☐ YES (if checked answer 7d) 2 ☐ NO	7d. NUMBER OF PROJECTS LAST YEAR 7th grade _____ 8th grade _____ 9th grade _____
7e. Did your pupils take part in science fairs with other schools last year? 1 ☐ YES (if checked answer 7f) 2 ☐ NO	7f. NUMBER OF PUPILS WHO TOOK PART IN SCIENCE FAIRS WITH OTHER SCHOOLS 7th grade _____ 8th grade _____ 9th grade _____

8 SCIENCE TEXTBOOKS & SUPPLEMENTARY MATERIALS (check appropriate column for each grade)

8a. MATERIALS	LEVEL	YES	NO
1. Are textbooks used?	7th grade	1 ☐	2 ☐
	8th grade	1 ☐	2 ☐
	9th grade	1 ☐	2 ☐
(a) Is a single basic textbook used?	7th grade	1 ☐	2 ☐
	8th grade	1 ☐	2 ☐
	9th grade	1 ☐	2 ☐
(b) Are textbooks used in grades 7, 8, & 9 a coordinated series?		1 ☐	2 ☐
(c) Are textbooks loaned free of charge by the school?	7th grade	1 ☐	2 ☐
	8th grade	1 ☐	2 ☐
	9th grade	1 ☐	2 ☐
(d) Do pupils rent textbooks?	7th grade	1 ☐	2 ☐
	8th grade	1 ☐	2 ☐
	9th grade	1 ☐	2 ☐
(e) Do pupils purchase textbooks?	7th grade	1 ☐	2 ☐
	8th grade	1 ☐	2 ☐
	9th grade	1 ☐	2 ☐

MATERIALS	LEVEL	YES	NO
2. Are locally prepared resource materials used in place of a textbook?	7th grade	1 ☐	2 ☐
	8th grade	1 ☐	2 ☐
	9th grade	1 ☐	2 ☐
3. Are commercially available workbooks used?	7th grade	1 ☐	2 ☐
	8th grade	1 ☐	2 ☐
	9th grade	1 ☐	2 ☐
4. Are locally prepared worksheets used?	7th grade	1 ☐	2 ☐
	8th grade	1 ☐	2 ☐
	9th grade	1 ☐	2 ☐

COMMENTS:

8b. Give the most recent copyright date of the texts for each science course in your school:

GRADE LEVEL (if NO textbook is used, check none)	NONE	GENERAL SCIENCE	OTHER SCIENCE COURSES (Write course titles in spaces below)		
			course title	course title	course title
7th grade	☐				
8th grade	☐				
9th grade	☐				

9 AIDS TO TEACHING

Which types of supervisors or consultants are available to science teachers in your school? If not available, check none.

AFFILIATION OF SUPERVISORS OR CONSULTANTS	NONE	TYPE OF SUPERVISOR OR CONSULTANT: GENERAL CURRICULUM SPECIALIST	TYPE OF SUPERVISOR OR CONSULTANT: SCIENCE SPECIALIST
City or county supervisor or consultant	1 ☐	2 ☐	3 ☐
State Department supervisor or consultant	1 ☐	2 ☐	3 ☐
Consultant from college or university	1 ☐	2 ☐	3 ☐
Helping teacher employed by: school system for several schools	1 ☐	2 ☐	3 ☐
Helping teacher employed by: single school	1 ☐	2 ☐	3 ☐
Local, professionally trained people (doctors, pharmacist, and scientist)	1 ☐	2 ☐	3 ☐
Other (specify)			

10 INSERVICE TRAINING AND EDUCATION PROGRAM FOR TEACHERS OF SCIENCE

		YES	NO
10a. Does your school participate in an in-service training program sponsored by the area or district school system?		1 ☐	2 ☐
10b. Does your school have a school-administered in-service training program?		1 ☐	2 ☐
10c. Are funds provided for teacher participation in an outside training program by:	Local board of education?	1 ☐	2 ☐
	State Department of Education?	1 ☐	2 ☐
	Private community group	1 ☐	2 ☐
	OTHER (specify)		
10d. Are funds provided for teachers to participate in curriculum development programs during the summer months?		1 ☐	2 ☐

10e. How many of your teachers currently teaching science have taken part in a National Science Foundation (NSF) sponsored science institute? _____

NOTE.—Section 11 of the questionnaire has been deleted since it was not applicable to this report.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1967—O 231-938